

# **NF3400**

## **Product Guide**

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JKK

## From The Editors...

This manual is designed to help Information Technology professionals and System Engineers who are responsible for installing and maintaining Network Server systems.

We want to make this manual as useful as possible and welcome your comments. You can send comments to: **manuals@micronpc.com**. Our goal is to make your experience with micronpc.com even better.

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# About This Manual

This manual contains information to help you get the most from your server. Whether you are a new or experienced computer user, you will benefit more from this manual if you are familiar with its organization.

## Chapter 1: Getting Started

This section lists the special features of the server and available options, describes the parts you should have received and provides step-by-step procedures for setting up and starting the server.

## Chapter 2: System Features

This section outlines the major server components and lists detailed specifications of the server.

## Chapter 3: Connectors and Indicators

This section outlines how components are arranged in the chassis and provides detailed pinouts for the Internal Headers and External Connectors.

## Chapter 4: Installation

This section explains how to unpack and set-up one or more NF3400s into a rack configuration.

## Appendices

Appendix A: Regulatory Information  
Appendix B: Safety Guidelines  
Appendix C: Glossary  
Appendix D: Abbreviations

## Index

A comprehensive index is provided.

## Peripheral Manuals

In addition to this manual, you will want to consult the manuals for the Operating System and any Application software.

## Manual Conventions

The following conventions are used throughout this manual:

- Bullets present lists of information or items.
- 1. Numbered procedures guide you...
- 2. ...through sequential steps.

### Note



*Notes contain important information that is set off from the text. They will be accompanied by the symbol to the left, and in italic print.*

### Caution



*Caution messages appear before procedures which, if not observed, could result in loss of data or damage to equipment. They will be accompanied by the symbol to the left, and in italic print. Failure to heed these warning could negate the user warranty.*

### Warning



**Warning messages appear before procedures which, if not observed, will result in loss of data or damage to equipment, and/or could result in physical harm. They will be accompanied by the symbol to the left, and be in bold print. Failure to heed these warning could negate the user warranty.**

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# Chapter 1

## Getting Started

### The NF3400



### Unpacking the NF3400

Congratulations on the purchase of your Micron NetFRAME Series Server! Micron Electronics, Inc. is proud to be your provider of high performance, quality server products. With proper care and usage, your server will be a valuable asset to the corporate Network.

The Server comes securely packaged in a sturdy shipping carton. Upon receiving your Server, open the box and carefully remove the contents. If anything is missing or damaged, please contact Micron Electronics immediately. All systems should include the following items:

- ☐ The NF3400 Server
- ☐ An AC power cord
- ☐ Software and Micron Customer Resource Center CD and/or MRestore CD
- ☐ Product Guide

#### Note



*Items included may vary. Please check the packing slip included with your Server for the exact items you should have received.*

**Personal Inventory**

This Server system is designed for years of productive computing. Use this section to keep notes about details of your purchase. Update this section when you add new options.

Date of Purchase: \_\_\_\_\_

Telephone:

☐ 1-800-249-1178

Address: Micronpc.com  
900 E. Karcher Road  
Nampa, ID 83687

Micron E-mail address:

☐ [server.support@micronpc.com](mailto:server.support@micronpc.com)

Micron Web site:

☐ <http://support.micronpc.com>

Serial Number: \_\_\_\_\_

CPU type: \_\_\_\_\_

Hard disk capacity: \_\_\_\_\_

Memory capacity: \_\_\_\_\_

## Surge suppressors

We strongly recommend using a high-quality, external surge suppressor. It will shield your server from lightning strikes, surges, shorts, and other electrical hazards.

### Caution



*The best kind of back-up power source to connect your server to is a UPS (Uninterruptible Power Supply). The UPS should be connected to an AC Generator. The UPS will allow sufficient time to transfer power sources and prevent Network failure. Do not use inferior extension cords as this may result in damage to your server. Damage to the server that is directly caused by using a different power source will not be covered under warranty.*

## Heat, Cold, and Humidity

Find a spot for your server that's not too hot, too cold or too damp. Overheating can destroy computer components, so allow plenty of room for air to circulate around the case. The server will generally run well wherever you're comfortable. Extremes of temperature and humidity can be challenging to the system's parts.

### Warning



**Don't expose the server to extreme cold or heat, don't drop it, or spill fluids into the case. This can destroy the server and void the warranty.**

### Note



*If your server arrives in cold weather, do not apply power to it or the monitor until they have been allowed to come to room temperature.*

## Operating Environment

You can setup the server under a wide range of environmental conditions. However, to ensure long use and continued high performance, consider the following factors for permanently setting up your server:

- ☐ Set the server on a flat, stable surface. To prevent damage to the hard disk drive, avoid using the server where it will be exposed to strong vibration.
- ☐ Place the server away from electromagnetic pulses (EMP) or radio frequency (RF) interference (for example, television/stereo sets, copying machines, and air conditioners).
- ☐ Avoid using or storing the server where it will be exposed to extreme temperatures. In particular, do not leave the server in direct sunlight, over a radiator, or near a heat source for any period of time. High temperatures can damage the circuitry.
- ☐ Avoid exposing the server to high or low humidity. Extreme humidity can contribute to hard disk drive failure.
- ☐ Do not place the server where people can step on or trip over the power cord.
- ☐ The openings on the server are provided to protect the server from overheating. To ensure reliable operation, leave about 10 cm (4 inches) around the server for unobstructed air circulation. Avoid exposing the server to dust or smoke.

## Important Information About the Product Shipment Technical Support

If you have questions about the way the unit functions or about any technical hardware specifications, Micron's award winning Technical Support team is ready to help you. Support is available 24-hours a day, seven days a week. Contact us by visiting our web site at <http://www.micronpc.com> or telephone us toll-free at 1-800-249-1178. Please refer to the Micron Product guides included with the system for additional solutions to common setup problems, configuration and technical information.

## Problem Solving

Refer to the documents concerning your specific software application or open:

1. The Micron Web site at [support.micronpc.com](http://support.micronpc.com)
2. When contacting Micron Technical Support through an E-Mail message or toll-free call, have your customer number, serial number, order number, or case number ready.

3. To help us solve the problem, we will need detailed information describing the problem, such as the displayed on screen error messages, and any trouble-shooting steps you have taken.
4. A list of any hardware or software added after the purchase.
5. Please be stationed at the unit when you call. With your assistance, we will complete the troubleshooting steps necessary to solve the problem.

## Customer Service

Micron Customer Service can help you with questions on order status, credit, refunds or returns by E-Mail at [customer.service@micronpc.com](mailto:customer.service@micronpc.com) or call toll-free 1-888-Micron-2 (1-888-642-7662) 6am-8pm MT Monday through Friday; 7am-5pm MT Saturday.

## To obtain Accounting information

1. Please provide your order number, customer number or telephone number to a Micron Customer Service representative.
2. Please provide your purchase order number, Return Merchandise Authorization (RMA) number or case number, if applicable.

## To obtain Order Status

1. Access our Web Site at [www.micronpc.com](http://www.micronpc.com) and visit the Service and Support page for online order status.
2. Telephone our Customer Service department toll-free and wait for the automated order status prompt with your order reference number.
3. Telephone our Customer Service department to speak with a representative. Please have your order reference number, customer number, serial number, purchase order number, case number, or the main business telephone number under which your order was placed.

## For information regarding Refunds and Returns

1. Contact our Customer Service department by telephone or E-Mail and request a Return Merchandise Authorization (RMA) number or a part request number within thirty (30) days from the date your order was shipped.
2. Have your order number, customer number, serial number, or case number ready.

## How To Contact Micronpc.com

### Technical Support and Customer Service:

#### Toll-Free Telephone Numbers

|                                |                |
|--------------------------------|----------------|
| Micron PC:                     | 1-877-894-5693 |
| Micron Commercial Systems:     | 1-877-894-5694 |
| Micron Government Systems:     | 1-877-894-5695 |
| (Outside the U.S. or Canada)   | 1-208-893-3434 |
| Micron NetFRAME Server Support | 1-800-249-1178 |

#### E-Mail Addresses

|                                 |                                 |
|---------------------------------|---------------------------------|
| Customer Service:               | Customer.service@micronpc.com   |
| Micron PC:                      | CSB.service@micronpc.com        |
| Micron Commercial Systems:      | Commercial.service@micronpc.com |
| Micron Government Systems:      | GovEdu.service@micronpc.com     |
| Micron NetFRAME Server Support: | server.support@micronpc.com     |

For parts, peripherals or upgrades, telephone Micron Additions at 1-888-634-8807.

Micronpc.com wants to make this product guide as useful as possible and welcomes your suggestions and comments. Please provide the title, part number and page number of the document and E-Mail your suggestions to: manuals@micronpc.com.

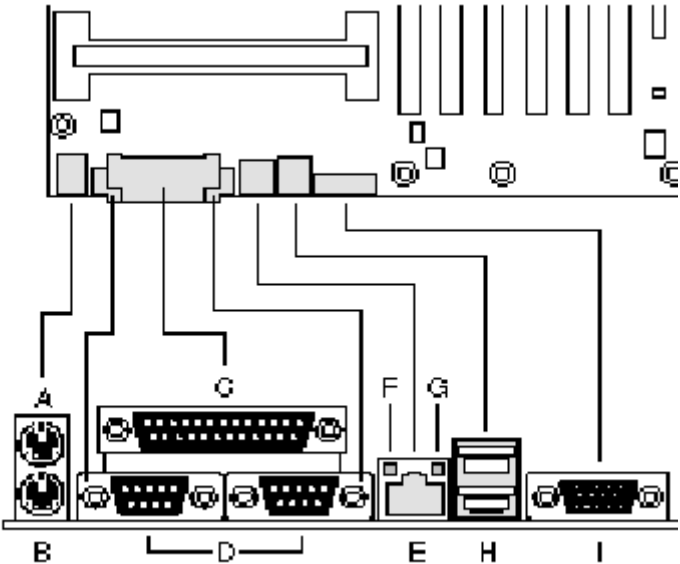
# Chapter 2

## System Features

### Server Board Features

| <u>Feature</u>           | <u>Description</u>  |
|--------------------------|---|
| <b>Processor</b>         | Up to two Intel Pentium® II or Pentium® III processors (with 100 MHz system bus) operating at 1.8 V to 3.5 V. The server board's voltage regulator is automatically programmed by the processor's VID pins to provide the required voltage.   |
| <b>Memory (DRAM)</b>     | Four 72-bit sockets for 168-pin, gold contact, 100 MHz, ECC or non-ECC, registered or unbuffered, SDRAM dual inline memory modules (DIMM).  |
| <b>PCI bus</b>           | Four standard PCI (PCI-33/32-bit) expansion slots for add-in boards.<br>1x32-bit PCI bus. Embedded devices: Network Interface Controller (NIC) and SCSI controller.<br><br>Two PCI-66 MHz 32-bit 5 V expansion slots (backward compatible to PCI-33 MHz 32-bit).                          |
| <b>ISA bus</b>           | One ISA expansion slot for an add-in board. Embedded PC-compatible support (serial, parallel, mouse, keyboard, diskette, and Plug and Play features).   |
| <b>Server Management</b> | Thermal / voltage monitoring and error handling.<br>Real time clock/calendar (RTC).<br>Front panel controls and indicators (LEDs).<br>System Setup Utility (SSU).<br>Basic Input/Output System (BIOS), Power On Self Test (POST) and Setup stored in flash memory.                        |
| <b>Graphics</b>          | Integrated onboard Cirrus Logic® CL-GD5480 super video graphics array (SVGA) controller. Embedded: 2 MB of video memory.  |
| <b>SCSI</b>              | Adaptec® AIC-7896, supporting onboard Ultra2 (LVD) wide and Ultra-wide SCSI interfaces. Support for the Adaptec ARO-1130U2 RAID Port® III card is built into PCI slot 4.  |
| <b>Network</b>           | Integrated onboard NIC, an Intel® 82559 single chip PCI LAN controller for 10 or 100 Mbps TX Fast Ethernet networks. RJ-45 Ethernet connector and indicator LEDs at I/O back panel.   |
| <b>System I/O</b>        | PS/2-compatible keyboard and mouse ports, 6-pin DIN.<br>Advanced parallel port, supporting enhanced parallel port (EPP) level 1.7 and 1.9, enhanced capabilities port (ECP) compatible 25-pin.<br>VGA video port, 15-pin. Two serial ports, 9-pin.<br>RJ-45 Ethernet port. Two USB ports. |
| <b>Form Factor</b>       | Server ATX form factor, 12 x 13 inches, ATX 2.01 compliant I/O.   |

Back Panel Connectors



- A. Mouse connector

B. Keyboard connector

C. Parallel Port connector

D. Serial Port connectors

E. Network connector
- F. Green NIC LED

G. Orange NIC LED

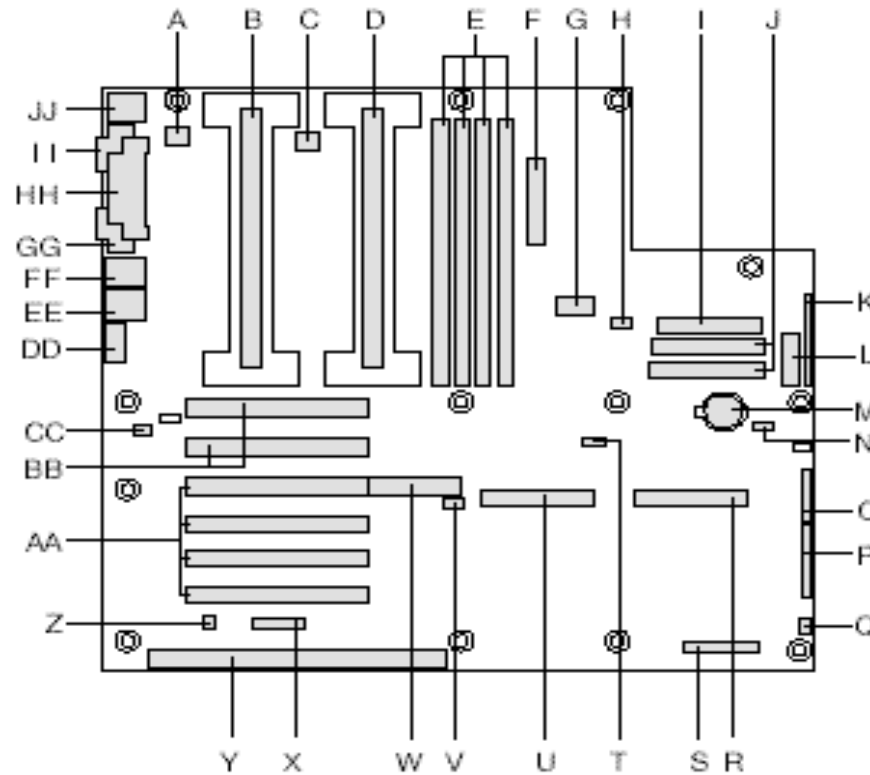
H. USB connectors

I. Video connector

NIC LEDs

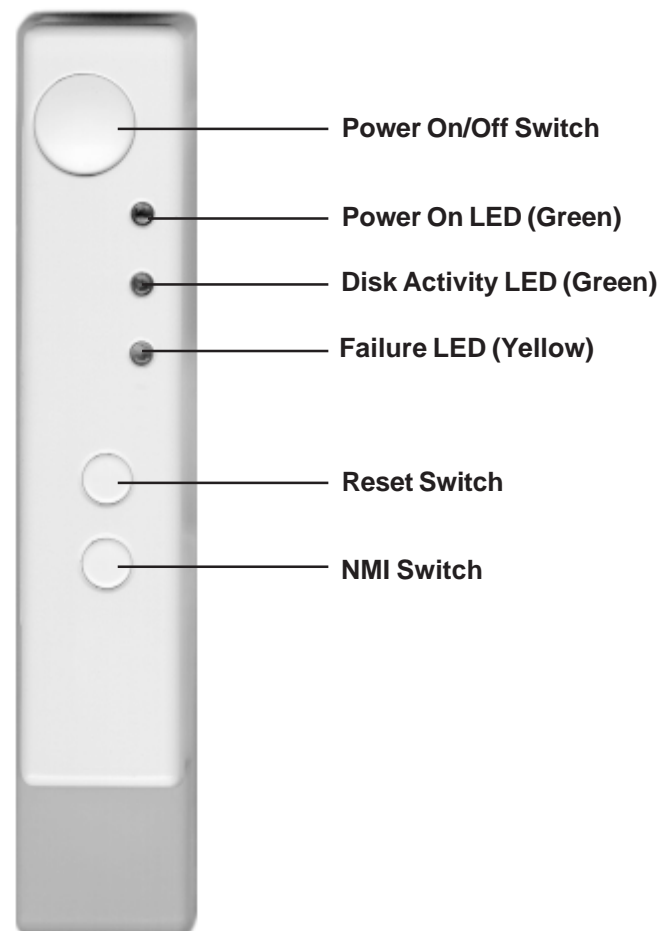
| NIC LED Color | If it's on                             | If it's blinking                              | If it's off                 |
|---------------|--|---|-----------------------------|
| Orange        | 100 Mbps network connection.           | NA  | 10 Mbps network connection. |
| Green         | Linked to network, no network traffic. | Linked to network, sending or receiving data. | Not linked to network.      |

## Server Board Connector and Component Locations



- |   |  |  |
|---|--|--|
| <b>A.</b> Fansink connector 2           | <b>N.</b> Isolated Server Management (ISOL) IMB (Intelligent Management Bus) connector | <b>Y.</b> ISA connector                          |
| <b>B.</b> Secondary processor           | <b>O.</b> Jumper block   | <b>Z.</b> Chassis intrusion connector            |
| <b>C.</b> Fansink connector 1           | <b>P.</b> Jumper block   | <b>AA.</b> PCI-33/32 connectors                  |
| <b>D.</b> Primary processor             | <b>Q.</b> Fan connector 1  | <b>BB.</b> PCI-66/32 connectors                  |
| <b>E.</b> DIMM slots                    | <b>R.</b> Ultra Wide SCSI connector  | <b>CC.</b> Fan connector FAN2B                   |
| <b>F.</b> Main power connector          | <b>S.</b> Server monitor module (SMM) connector  | <b>DD.</b> Video connector                       |
| <b>G.</b> ATX Aux power connector       | <b>T.</b> External Wake on LAN† connector  | <b>EE.</b> USB connectors                        |
| <b>H.</b> Fan connector FAN2A           | <b>U.</b> Ultra2/LVDS SCSI connector   | <b>FF.</b> NIC connector                         |
| <b>I.</b> Floppy connector              | <b>V.</b> Hard drive LED connector   | <b>GG.</b> Serial port connector (default COM 1) |
| <b>J.</b> IDE connectors                | <b>W.</b> Adaptec ARO-1130U2 RAID Port III connector/PCI slot 4                        | <b>HH.</b> Parallel port connector               |
| <b>K.</b> ATX front panel connector     | <b>X.</b> Intelligent Chassis Management Bus (ICMB) header                             | <b>II.</b> Serial port connector (default COM 2) |
| <b>L.</b> Front panel connector, 16 pin |  | <b>JJ.</b> Mouse/keyboard connectors             |
| <b>M.</b> Battery                       |  |  |

## Front Panel Controls and LED Indicators



## Processor

Each Pentium II or Pentium III processor is packaged in a cartridge. The cartridge includes the processor core with an integrated 16 KB primary (L1) cache, the secondary (L2) cache, and a back cover.

The processor implements the MMX™ technology and maintains full backward compatibility with the 8086, 80286, Intel386™, Intel486™, Pentium, Pentium Pro and previous Pentium II processors. The processor's numeric coprocessor significantly increases the speed of floating point operations and complies with ANSI/IEEE standard 754-1985.

Each processor cartridge connects to the server board through a 242-pin edge connector. The cartridge is secured by a retention mechanism attached to the server board. Depending on configuration, your server may have one or two processors.

The processor external interface is MP (Multi-Processor) ready and operates at 100 MHz. The processor contains a local APIC (Advanced Programmable Interrupt Controller) section for interrupt handling in MP and UP (Uni-Processor) environments.

The second level cache is located on the substrate of the S.E.C. cartridge. The cache includes burst pipelined synchronous static RAM (BSRAM). The L2 cache is offered in 512 KB configurations only, with error correcting code (ECC) that operates at half the core clock rate.

### Note



*If you install a processor that is 550 MHz, and you use the server management feature board, you must run the FRU / SDR update utility.*

## System Memory

Only 100 MHz PC/100 ECC or Non-ECC SDRAM is supported by the server board. Memory is partitioned as four banks of SDRAM DIMMs, each providing 72-bits of noninterleaved memory (64-bit main memory plus ECC):

- ☐ Install from 64 MB to 2 GB of memory, using registered DIMMs.
- ☐ Install from 32 MB to 2 GB of memory, using unbuffered DIMMs.

Memory should be added in order from slot 1 to slot 4.

### Note



*Do not mix registered and unbuffered memory. Non-ECC memory may be installed but ECC memory is recommended in a server environment. Mixing Non-ECC memory and ECC memory causes all ECC features to be disabled.*

The controller automatically detects, sizes, and initializes the memory array depending on the type, size and speed of the installed DIMMs. It reports memory size and allocation to the server via configuration registers.

**Note**

*Use DIMMs that have been tested for compatibility with the server board. Contact your Micron sales representative or dealer for a current list of approved memory modules.*

**440GX Host Bridge / Memory Controller**

The L440GX+ is designed around the Intel® 82440GX AGPSet (440GX). This device provides 100 MHz processor host bus interface support, DRAM controller, PCI bus interface, AGP interface (used on L440GX+ for PCI-66/5V), and power management functions. The host bus/memory interface in the 440GX is optimized for 100 MHz operation, using 100 MHz SDRAM main memory. The PCI interface is PCI 2.1-compliant, providing a 33 MHz / 5V signaling environment for embedded controllers and slots in the single PCI segment on L440GX+. The 440GX memory controller supports up to 2 GB of ECC or Non-ECC memory, using PC/100 compliant Synchronous DRAM (SDRAM) devices on DIMM plug-in modules. ECC can detect and correct single-bit errors, and detect multiple-bit errors.

**Peripherals****Super I/O Chip**

The National® 87309 device supports two serial ports, one parallel port, diskette drive, PS/2-compatible keyboard and mouse. The server board provides a connector interface for each port.

**Serial Ports**

Each serial port can be set to one of four different COMx ports and can be enabled separately. When enabled, each port can be programmed to generate edge or level sensitive interrupts. When disabled, serial port interrupts are available to add-in boards.

**Parallel Port**

The 87309 provides one IEEE 1284-compatible 25-pin bidirectional EPP (supporting levels 1.7 and 1.9). BIOS programming of the 87309 registers enable the parallel port and determine the port address and interrupt. ECP mode is supported with two possible DMA channels. When disabled, the interrupt is available to add-in boards.

**Add-in Board Slots**

The server board has one full-length ISA bus connector. ISA features:

- ☐ Bus speed up to 8.33 MHz
- ☐ 16-bit memory addressing
- ☐ Type A transfers at 5.33 Mbps
- ☐ Type B transfers at 8 Mbps
- ☐ 8 or 16-bit data transfers
- ☐ Plug and Play ready

**Add-in Board Slots** (continued)

The server board has four full-length standard PCI (PCI-33/32 bit) connectors. PCI features:

- ☐ Bus speed up to 33 MHz
- ☐ 32-bit memory addressing
- ☐ 5 V signaling environment
- ☐ Burst transfers of up to 133 MBps (Megabytes per second)
- ☐ 8, 16 or 32-bit data transfers
- ☐ Plug and Play ready
- ☐ Parity enabled

The server board has two full-length PCI-66 universal connectors (5 volt/3.3 volt cards designed for the 3.3v connector --cards with only one notch-- will not fit). PCI features:

- ☐ Bus speed up to 66 MHz
- ☐ 32-bit memory addressing
- ☐ 5 V/3.3 V signaling environment
- ☐ Burst transfers of up to 266 MBps
- ☐ 8, 16 or 32-bit data transfers
- ☐ Plug and Play ready
- ☐ Parity enabled

**Note**

*If you install a PCI-33 card into one of the PCI-66 slots, the bus speed for both slots will be lowered to 33 MHz. The components on some full-length cards installed in slot 6 may interfere with the DIMM connector latches.*

**Video**

The onboard, integrated Cirrus Logic CL-GD5480 64-bit VGA chip contains an SVGA controller that is fully compatible with these video standards: CGA, EGA, Hercules<sup>®</sup> Graphics, MDA, and VGA. The standard configuration comes with 2 MB of 10 ns onboard Synchronous Graphics Memory (SGRAM). The video controller supports pixel resolutions of up to 1600 x 1200 and up to 16.7 Million colors.

The SVGA controller supports analog VGA monitors (single and multiple frequency, interlaced and noninterlaced) with a maximum vertical retrace noninterlaced frequency of 100 Hz.

You cannot add video memory to the server board. Depending on the environment, the controller displays up to 16.7 M colors in some video resolutions. It also provides hardware accelerated bit block transfers (BITBLT) of data.

## SCSI Controller

The embedded Adaptec AIC-7896 dual function SCSI controller provides both Ultra2 (LVDS) wide and Ultra wide SCSI interfaces as two independent PCI functions.

The SCSI bus is terminated on the server board with active terminators that cannot be disabled. The onboard device must always be at one end of the bus. The device at the end of the cable must be terminated. LVDS devices generally do not have termination capabilities. Non-LVDS devices generally are terminated through a jumper or resistor pack. The SCSI cable included with your server board (or integrator's kit) has been modified to include active termination. The cable is capable of supporting both Ultra-2 and non-Ultra-2 SCSI devices. Proper termination of the SCSI bus is required for stable operation of SCSI devices. When attaching any SCSI device to the cable, verify that they are NOT terminated. This is usually a configurable option using a jumper or terminator block on the device. Check the documentation that came with your SCSI device to verify this option. Termination of the SCSI bus is implemented using the active termination on the server board along with the active termination at the end of the SCSI cable.

## IDE Controller

IDE is a 16-bit interface for intelligent disk drives with disk controller electronics onboard. The PCI/ISA/IDE Accelerator, also known as PIIX4e, is a multifunction device on the server board that acts as a PCI based Fast IDE controller. The device controls:

- ☐ PIO and IDE DMA/bus master operations
- ☐ Mode 4 timings
- ☐ Transfer rates up to 33 MBps (Megabytes per second)
- ☐ Buffering for PCI/IDE burst transfers
- ☐ Master/slave IDE mode
- ☐ Up to two devices per channel; two channels, IDE0 and IDE1

### Note



**An 18-inch maximum length for the IDE cable on each channel:** *You can connect an IDE signal cable, up to a maximum of 18-inches, to each IDE connector on the server mainboard. Each cable can support two devices, one at the end of the cable and one 6 inches from the end of the cable.*

## Network Controller

The server board includes a 10BASE-T/100BASE-TX network solution based on the Intel 82559 single chip Fast Ethernet PCI Bus Controller. As a PCI bus master, the controller can burst data at up to 132 MBps. The controller contains two receive and transmit FIFO buffers that prevent data overruns or underruns while waiting for access to the PCI bus. The controller has the following:

- ☐ 32 bit PCI bus master interface (direct drive of bus), compatible with PCI Bus Specification, Revision 2.1
- ☐ Chained memory structure with improved dynamic transmit chaining for enhanced performance
- ☐ Programmable transmit threshold for improved bus utilization
- ☐ Early receive interrupt for concurrent processing of receive data
- ☐ Onchip counters for network management
- ☐ Autodetect and autoswitching for 10 or 100 Mbps (Megabits per second) network speeds; capable of full or half duplex, with back-to-back transmit at 100 Mbps

The network status LEDs on the server board indicate:

- ☐ Transmit/receive activity on the LAN
- ☐ Valid link to the LAN
- ☐ 10/100 Mbps transfer mode

## Keyboard and Mouse

The keyboard/mouse controller is PS/2-compatible. The server may be locked automatically if there is no keyboard or mouse activity for a predefined length of time, if specified through the System Setup Utility (SSU). Once the inactivity (lockout) timer has expired, the keyboard and mouse do not respond until the previously stored password is entered.

## ACPI

The L440GX+ supports the Advanced Configuration and Power Interface (ACPI) as defined by the ACPI 1.0 and PC97 specifications. An ACPI aware operating system can put the system into a state where the hard drives spin down, the system fans stop, and all processing is halted. However, the power supply will still be on and the processors will still be dissipating some power, so the power supply fan and processor fans will still run.

**ACPI** (continued)

The L440GX+ supports sleep states s0, s1, s4, and s5. With future versions of Microsoft Windows® 9X that support ACPI, the BIOS will only support sleep states s0, s1, and s5. With future versions of Microsoft Windows NT® x that support ACPI, the BIOS will support sleep states s0, s1, s4, and s5.

- ☐ s0: Normal running state.
- ☐ s1: Processor sleep state. No context will be lost in this state and the processor caches will maintain coherency.
- ☐ s4: Hibernate or Save to Disk: The memory and machine state are saved to disk. Pressing the power button or other wakeup event will restore the system state from the disk and resume normal operation. This assumes that no hardware changes have been made to the system while it was off.
- ☐ s5: Soft off: Only the RTC section of the PIIX4 and the BMC are running in this state.

**Caution**

*The system power is off only when the AC power is completely disconnected.*

**Server Management****Baseboard Management Controller (BMC)**

Server Management features are implemented using one microcontroller.

All server management functionality is concentrated in the BMC. The BMC and associated circuitry are powered from + 5V\_Standby, which remains active when server power is switched off and the server is still plugged into AC power.

One major function of the BMC is to autonomously monitor system management events, and log their occurrence in the nonvolatile System Event Log (SEL). These include events such as overtemperature and overvoltage conditions, fan failure or chassis intrusion. To enable accurate monitoring, the BMC maintains the nonvolatile Sensor Data Record (SDR), from which sensor information can be retrieved. The BMC provides an ISA host interface to SDR sensor information, so software running on the server can poll and retrieve the server's current status.

SEL contents can be retrieved after system failure, for analysis by field service personnel using server management software tools such as the Server Control available on the CD-ROM that ships with the server mainboard.

Because the BMC is powered by 5V\_Standby, SEL and SDR information are also available via the Intelligent Management Bus (IMB). An Emergency Management Card, such as the Intel® LANDesk® SMM (Server Monitor Module) card available

## Baseboard Management Controller (BMC) (continued)

with the LANDesk Server Manager Pro package, can obtain the SEL and make it remotely accessible using a LAN or telephone line connection. While it receives the proper current, the BMC does the following:

- ☐ Monitors server board temperature and voltage
- ☐ Monitors processor presence and controls FRB
- ☐ Detects and indicates baseboard fan failure
- ☐ Manages the SEL interface
- ☐ Manages the SDR Repository interface
- ☐ Monitors the SDR/SEL timestamp clock
- ☐ Manages the server board Field Replaceable Unit (FRU) information interface
- ☐ Monitors the system management watchdog timer
- ☐ Monitors the periodic SMI timer
- ☐ Manages front panel NMI handling
- ☐ Monitors the event receiver
- ☐ Manages the ISA host and IMB interface
- ☐ Controls secure mode, including video blanking, floppy write-protect monitoring, and front panel lock/unlock initiation
- ☐ Manages the sensor event initialization agent
- ☐ Controls Wake on LAN via Magic Packet® support

## Emergency Management Port Console

The Emergency Management Port (EMP) Console provides an interface to the Emergency Management Port (EMP). This interface allows remote server management via a modem or direct (serial port to serial port) connection.

The server control operations available with EMP Console are:

- ☐ Connecting to remote servers
- ☐ Powering the server on or off
- ☐ Resetting the server

The EMP Console uses three management plug-ins to monitor the server:

- ☐ SEL Viewer
- ☐ SDR Viewer
- ☐ FRU Viewer

**Note**

The EMP Console also has Phonebook plug-in that can be used to create and maintain a list of servers and their phone numbers.

*EMP and PEP (Platform Event Paging) share the modem, if installed. PEP has priority over all applications except EMP. If an alert occurs, PEP will reset your modem and page you.*

**Platform Event Paging**

With Platform Event Paging (PEP), your server can be configured to automatically dial up a paging service and page you when a platform event occurs. Platform events include temperature out-of-range, voltage out-of-range, chassis intrusion, fan failure, etc.

If PEP is enabled and the BMC receives or detects a new event, it automatically sends a page. It can send a page if the processors are down or if the system software is unavailable.

PEP needs an external modem connected to the server's EMP (Emergency Management Port) serial connection. This is typically the COM2 serial connector.

**Security****Security with Mechanical Locks and Monitoring**

To help prevent unauthorized entry or use of the server, the Server Control server management software monitors the system intrusion switch.

If installed, you can activate the chassis intrusion alarm switch. When the side panel or front door is opened, the switch transmits an alarm signal to the server board, where the BMC firmware and server management software will process the signal. For example, the system can be programmed to respond to an intrusion by powering down or by locking the keyboard.

**Software Locks**

The BIOS Setup and the System Setup Utility (SSU) provide a number of security features to prevent unauthorized or accidental access to the system. Once the security measures are enabled, you can access the system only after you enter the correct password(s). For example:

- ☐ Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time out period—1 to 120 minutes.
- ☐ Set and enable an administrative password.
- ☐ Set and enable a user password.
- ☐ Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches.

- ☐ Activate a hot key combination to enter secure mode quickly.
- ☐ Disable writing to the diskette drive when secure mode is set.
- ☐ Disable access to the boot sector of the operating system hard disk drive.

## Using Passwords

You can set the user password, the administrator password, or both passwords. If only the user password is set, you:

- ☐ Must enter the user password to enter BIOS Setup or the SSU.
- ☐ Must enter the user password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU.
- ☐ Must enter the user password to exit secure mode.

If only the administrator password is set, you:

- ☐ Must enter the administrator password to enter BIOS Setup or the SSU.
- ☐ Must enter the administrator password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU.
- ☐ Must enter the administrator password to exit secure mode.

If both passwords are set, you:

- ☐ May enter the user password to enter BIOS Setup or the SSU. However, you will not be able to change many of the options.
- ☐ Must enter the administrator password if you want to enter BIOS Setup or the SSU and have access to all of the options.
- ☐ May enter either password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU.
- ☐ May enter either password to exit secure mode.

## Secure Mode

Configure and enable the secure boot mode by using the SSU. When secure mode is in effect:

- ☐ You can boot the server and the operating system will run, but you must enter the user password to use the keyboard or mouse.
- ☐ You cannot turn off system power or reset the server from the front panel switches.

Secure mode has no effect on functions enabled via the Server Manager Module or power control via the real time clock. Taking the server out of secure mode does not change the state of system power. That is, if you press and release the power switch while secure mode is in effect, the system will not be powered off when secure mode is later removed. However, if the front panel power switch remains depressed when secure mode is removed, the server will be powered off.

## Summary of Software Security Features

The table below lists the software security features and describes what protection each offers. In general, to enable or set the features listed here, you must run the SSU and go to the Security Subsystem Group, menu. The table also refers to other SSU menus and to the Setup utility.

| <b>Feature</b>  | <b>Description</b>   |
|---|--|
| <b>Secure mode</b>  | <p>Setting and enabling passwords automatically places the system in secure mode.</p> <p>If you set a hot-key combination (through the SSU or Setup), you can secure the system simply by pressing the key combination. This means you do not have to wait for the inactivity time-out period.</p> <p>When the system is in secure mode:</p> <p>The server can boot and run the operating system, but mouse and keyboard input is not accepted until the user password is entered.</p> <p>At boot time, if a CD is detected in the CD-ROM drive or a diskette in drive A, the system prompts for a password. When the password is entered, the server boots from CD or diskette and disables the secure mode.</p> <p>If there is no CD in the CD-ROM drive or diskette in drive A, the server boots from drive C and automatically goes into secure mode. All enabled secure mode features go into effect when the server boots.</p> <p>To leave secure mode: Enter the correct password(s).</p> |
| <b>Disable writing to diskette</b>  | <p>In secure mode, the server will not boot from or write to a diskette unless a password is entered. To set this feature, use the SSU Security Subsystem Group.</p> <p>To write protect access to diskette whether the server is in secure mode or not, use the Setup main menu, Floppy Options, and specify Floppy Access as read only.</p>  |
| <b>Disable the power and reset buttons</b>  | <p>Enable the feature through the SSU. Then the power and reset buttons are disabled when the server is in secure mode.</p>  |
| <b>Set a time out period so that keyboard and mouse input are not accepted</b><br><b>Also, screen can be blanked, and writes to diskette can be inhibited</b> | <p>Specify and enable an inactivity time out period of from 1 to 120 minutes.</p> <p>If no keyboard or mouse action occurs for the specified period, attempted keyboard and mouse input will not be accepted.</p> <p>The monitor display will go blank, and the diskette drive will be write protected (if these security features are enabled through Setup or the SSU).</p> <p>To resume activity: Enter the correct password(s).</p>  |

continued

## Software Security Features

(continued)

| <u>Feature</u>  | <u>Description</u>   |
|---|--|
| <b>Control access to using the SSU: set administrative password</b>   | <p>To control access to setting or changing the system configuration, set an administrative password and enable it through Setup or the SSU.</p> <p>If both the administrative and user passwords are enabled either can be used to boot the server or enable the keyboard and/or mouse, but only the administrative password will allow Setup and the SSU to be changed.</p> <p>To disable a password, change it to a blank entry or press CTRL-D in the Change Password menu of the Administrative Password Option menu found in the Security Subsystem Group.</p> <p>To clear the password if you cannot access Setup or the SSU, change the Clear Password jumper.</p> |
| <b>Control access to the system other than SSU: set user password</b> | <p>To control access to using the system, set a user password and enable it through Setup or the SSU.</p> <p>To disable a password, change it to a blank entry or press CTRL-D in the Change Password menu of the User Password Option menu found in the Security Subsystem Group.</p> <p>To clear the password if you cannot access Setup or the SSU, change the Clear Password jumper</p>  |
| <b>Boot without keyboard</b>  | <p>The system can boot with or without a keyboard. During POST, before the system completes the boot sequence, the BIOS automatically detects and tests the keyboard if it is present and displays a message. There is no entry in the SSU to enable or disable a keyboard.</p>  |
| <b>Specify the boot sequence</b>                                      | <p>The sequence that you specify on the menu in the SSU MultiBoot Group will determine the boot order. If secure mode is enabled (a user password is set), then you will be prompted for a password before the server fully boots. If secure mode is enabled and the "Secure Boot Mode" option is also enabled, the server will fully boot but will require a password before accepting any keyboard or mouse input.</p>   |

## Chassis Description

The all-new chassis concept for the File Server combines affordability, reliability, and expandability to maximize performance and security for the users. The user-friendly design makes it easy to access, upgrade and maintain. It can also be placed into a 19-inch rack mount or remain in the pedestal configuration. This chassis is made of high quality steel and can completely protect all components inside the chassis. The ventilation system keeps the components at the proper operating temperature.

## Chassis Physical Specifications

|                                 |  |
|---------------------------------|--|
| <b>Mainboard Size</b>           | Full AT<br>Full ATX  |
| <b>Cooling Fans</b>             | 80mm x 2, 92mm x 1   |
| <b>Drive Bays</b>               | 1 x 3.5-inch drive bay<br>9 x 5.25-inch drive bays   |
| <b>Security</b>                 | Mechanical Locks (Front Bezel)<br>Padlock Loop (Rear of Side Panel)<br>Intrusion Detector (Front and Side Panel) |
| <b>Power Supply</b>             | Single: 338W ATX Power Supply<br>Dual: 350W Power Supply (1 + 1 Redundant)                                       |
| <b>Dimension</b><br>(W x H x D) | 219mm x 484mm x 649mm<br>(8.62-inch x 19.1-inch x 25.6-inch)   |
| <b>Weight</b>                   | 16kg (35.27 lbs.)  |



## Feature Descriptions

Users can easily access, upgrade and maintain the system. The following are the detailed descriptions of the features.

### Front Bezel

The front bezel is designed as a removable door. With the front bezel open, the user can access all drive bays directly without taking out any other components.

Access to the power switch and the reset button is blocked and untouchable when the front bezel is closed. Any intentional or accidental shutdown by an unauthorized user is prevented by the locking bezel.

A tinted, vertical oval-shaped plastic plate on the front bezel allows the user to observe the LEDs that display server status even the front bezel is closed.

### I/O Panel

All I/O panel attachment is made from the rear of the chassis. The metal I/O plate is removable, and can be changed based on the form factors of the mainboard.

### Cooling System

The server comes with two 80mm cooling fans that are located beneath the power supply on the back panel of the chassis. The air is pulled through the front bezel of the chassis, and flows across the components to exit out the back. One chassis fan is attached to a variable speed control sensor that monitors the temperature inside the chassis. The sensor will adjust the speed of the fan to effectively maintain proper cooling of the server. A 92mm fan attached to the hard drive module is also monitored by the variable speed control sensor. Should either fan fail, the user is immediately notified by the error detection system.

### Security

The server is protected from unauthorized access by a mechanical lock and an electrical intruder detection system. The lock on the front bezel prohibits access to CD-ROMs or hard disk drives. Additionally, two electrical intrusion detectors will alarm whenever the front door or the side panel is opened.

### Power Supply

The server comes with either a high performance and high efficiency 338-Watt single power supply or a 350-Watt power supply module (1 + 1 redundant) that provides stable power distribution to a fully loaded system.

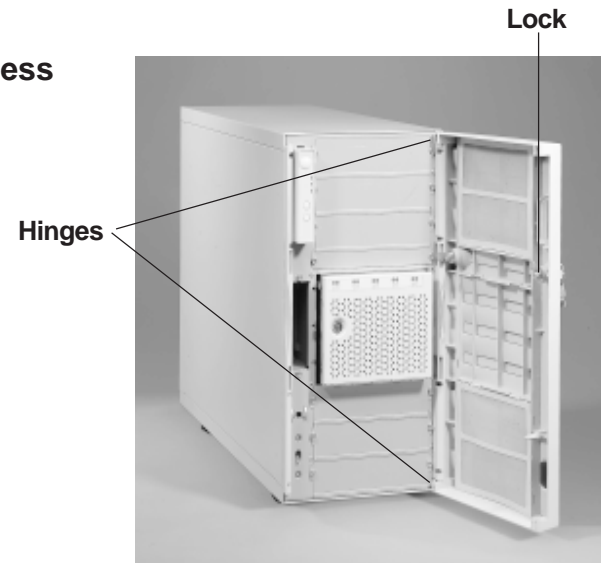
### Peripherals

The server case provides eleven drive bays, which consist of one 3.5-inch floppy drive bay and ten 5.25-inch drive bays. The 3.5-inch floppy drive bay is vertically sited on the middle-left of the front panel. The ten 5.25-inch drive bays are located from top to bottom across the front panel.

## Fitting Into The 19-inch Rack Mount

The chassis is a standard 19-inch server case, and can be placed into a 19-inch rack mount easily. Contact [micronpc.com](http://micronpc.com) sales to purchase the conversion kit.

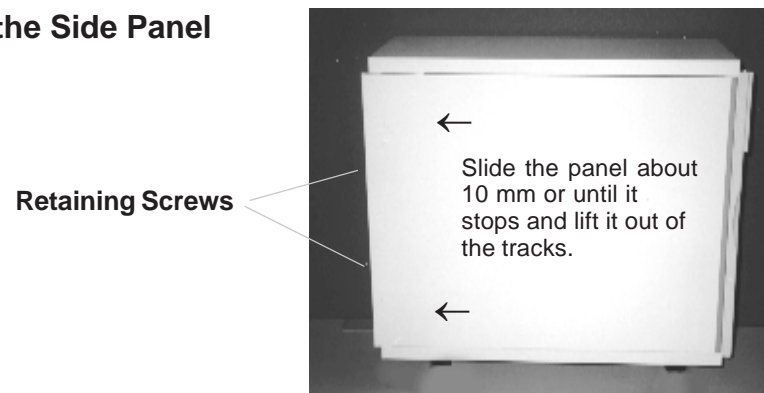
## Opening the Front Access Panel



The front bezel is a removable access panel.

1. Open the lock to allow the panel to swing open.
2. Remove the bezel from the hinges by pulling the panel by the corners.

## Removing the Side Panel



It is not necessary to remove the front bezel to remove the side panel. If the server is monitored by LanDesk, a record will be made in the Event Log.

1. Remove the two thumb screws from the back of the chassis.
2. Slide the panel toward the back about 10 mm or until it stops.
3. Lift the panel out of the track, be careful not to allow the panel to fall.

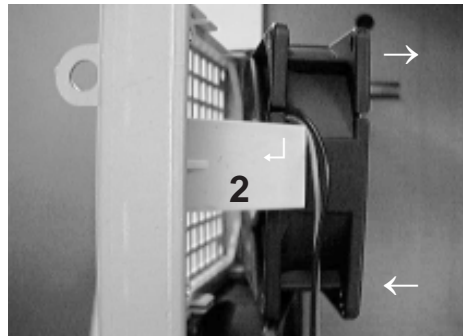
## Installing the Side Panel

To replace the side panel, reverse the installation process. Be careful not to touch the components with the panel.

1. Position the panel so the tabs align with the slots of the chassis.
2. Slide the panel toward the front or until it stops.
3. Tighten the retaining screws to secure the panel to the chassis.

## Removing and Installing a Cooling Fan

Each fan is held in its own retaining slot. Be careful not to break the retaining tab.

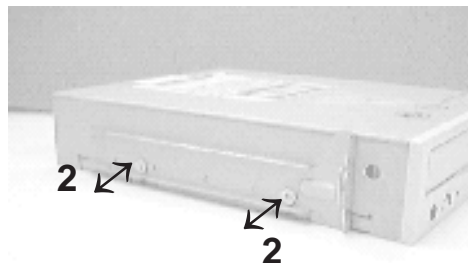


The retaining tab lip is secure against the fan's edge.

The fan should be installed to ensure air is exhausted from the chassis:

1. Remove the side panel from the chassis.
2. Release the retaining tab (2) with the thumb.
3. Pull the fan out of the base (as shown in 2) at a 45° angle until it clears all of the retaining tabs.
4. To install the cooling fan, reverse the steps.
5. Insert the fan at a 45° angle until it engages the rear retaining tabs.
6. To prevent vibration, ensure the retaining tab lip is secure against the fan's edge.
7. Ensure the fan is connected to the correct power pins and sensors.
8. Ensure the fan is positioned to vent the hot air out, and not force air and dust into the system.

## Removing and Installing a 5.25 inch Device



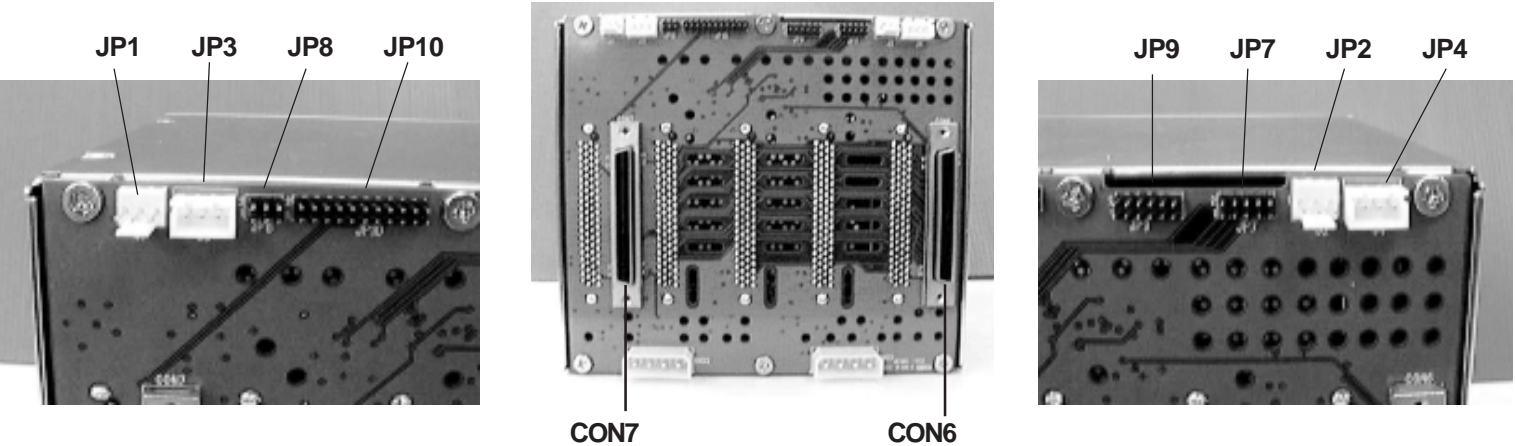
**5.25 and 3.5-inch devices are NOT Hot Swappable. Ensure AC Power is OFF before Removing or Installing a 5.25 or 3.5-inch device.**

All 5.25-inch devices should be removed and installed using this process.

1. Completely remove the front bezel.
2. Remove the side panel from the chassis.
3. Disconnect all of the cable from the device.
4. Remove the retaining screws (1) that hold the device to the chassis. These screws are not interchangeable with the slide rail retaining screws (2).
5. Pull the device out of the chassis (as shown in 1). It may be necessary to push the device from the inside of the case.
6. Disconnect the slide rails bracket from the old device by removing the 3 mm screws (2) and attaching the slide rails to both sides of the new device. Ensure the screws are tightened to at least 6 lb/ft., or hand tight.
7. To Install the new device, reverse the steps.
8. Insert the device until the slide rail bracket becomes flush with the chassis.
9. To prevent vibration, ensure the retaining screws secure the slide rail bracket flush against the chassis's edge. Ensure the screws are tightened to at least 6 lb/ft., or hand tight.
10. Ensure the 5.25-inch device is connected to the correct power pins and cables.

The Hard Drive Module

The module fits in the standard 3.5 to 5.25-inch bay of a fileserver chassis. It is designed around the SCA2 (80-pin) technology that supports the hot swappable RAID system functions. The module can provide AC Power support for up to five SCA2 hard drives. It has an attached 92mm, hot swappable, cooling fan.

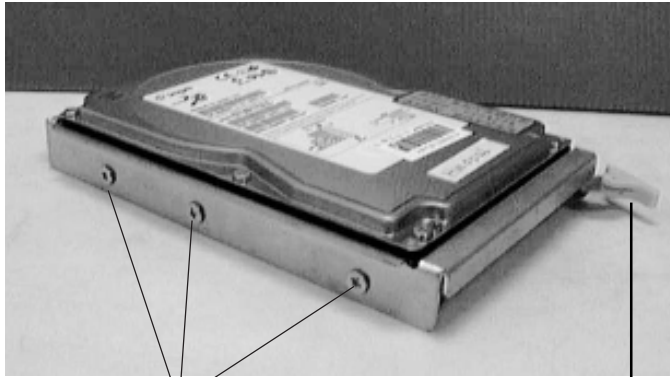


Back Plane Jumper and Connector Locations

| Jumper     | Functions   |
|------------|---|
| JP7        | Sets Hard Drive power (Default setting: Closed).            |
| JP8        | Reserved. <b>Close = On</b>                                 |
| JP9        | Connects LEDs to the front bezel display. <b>Open = Off</b> |
| JP10       | Pin 1-2: Sets SCSI ID Groups (Open: 1-5; Close: 9-13)       |
|            | Pin 3-12: Sets Motor On / Off (Default setting: Open).      |
|            | Pin 13-22: Sets Delay Start (Default setting: Open).        |
| Connectors | Functions   |
| JP3 / JP4  | Connects the Fan RPM Detectors.                             |
| JP1 / JP2  | Fan Power.  |
| CON6       | SCA SCSI Connector, Termination, as necessary.              |
| CON7       | SCA SCSI Connector.   |

## Removing and Installing a Hard Drive Device

The Hot Swappable Drive Module allows easy access to the SCA2 Hard Drives.



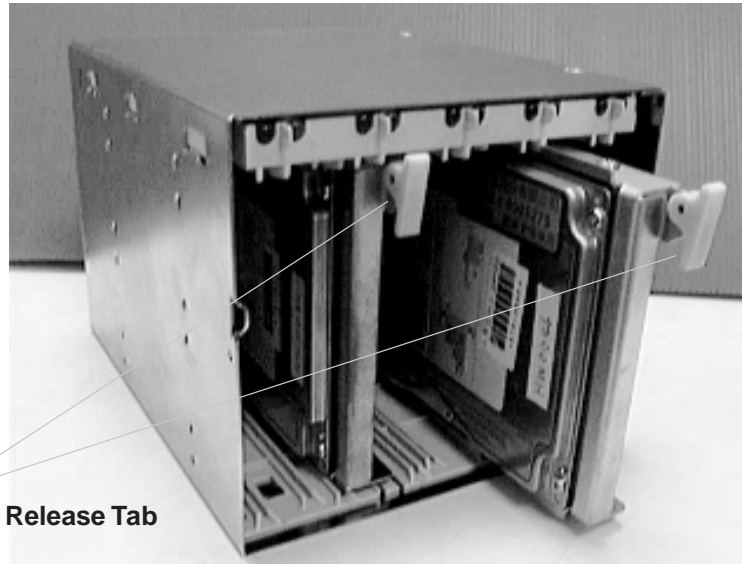
The SCA2 Hard Disk Drive (HDD) must be mounted to the guide frame with retaining #6-32 x 5L screws, three on each side. To prevent damage from vibration, ensure each retaining screw is tightened to at least 6lb/ft., hand tight.

### Caution



*Hard Disk Drives (HDD) are sensitive to Electrostatic Discharge.*

*To prevent head slap damage, Do NOT drop the HDD. To prevent damage from vibration, ensure each retaining screw is tightened to at least 6lb/ft., hand tight.*

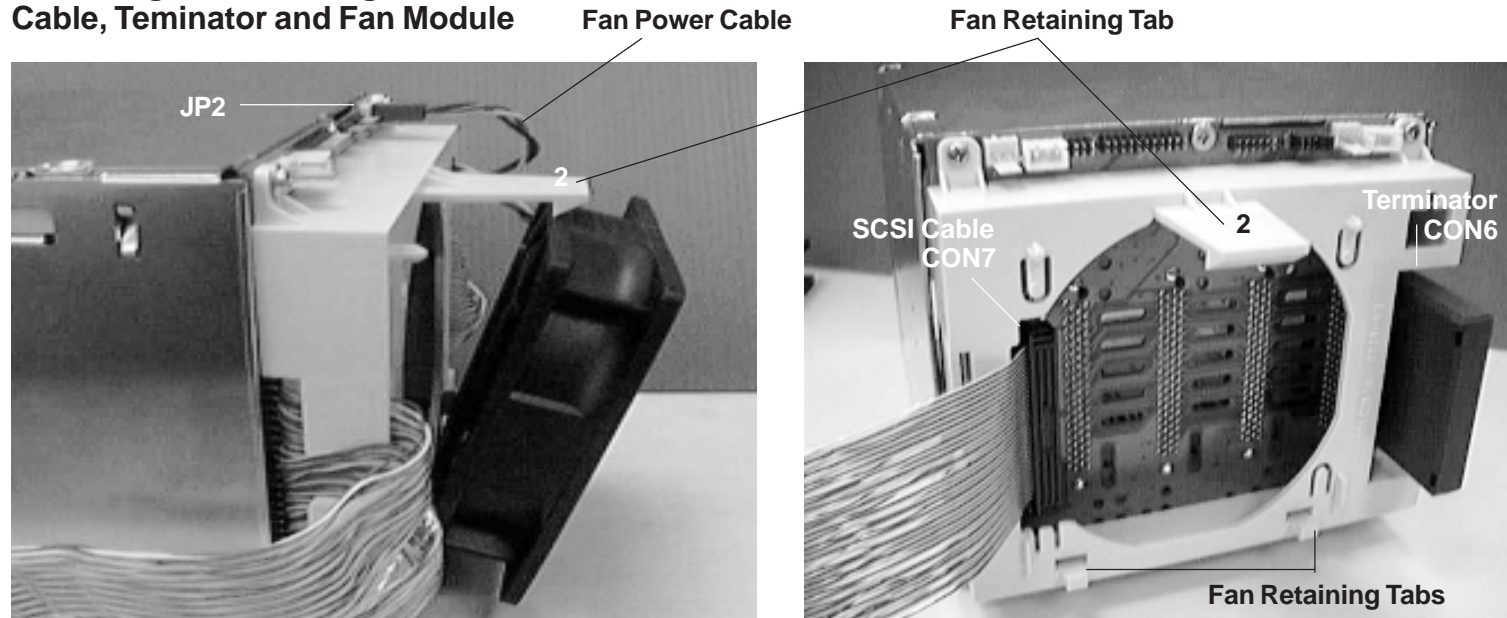


**Guide Frame Release Tab**

For illustration purposes only, the Hard Drive Module is not shown connected to the chassis. To remove or install a Hot Swappable SCA2 Hard Drive:

1. Lift up on the Guide Frame Release Tab until the Hard Drive Guide Frame is loose or until the frame is at least 1/4-inch out of the Module.
2. Pull the frame along the channel guides until it is completely clear of the Module.
3. Remove the HDD from the frame. Reuse the screws to attach the new HDD to the frame.
4. To Install the Hard Drive Guide Frame, ensure the HDD is flush against the tab side of the frame. Ensure all retainings screws are at least hand tight.
5. Insert the frame along the channel guides until it engages the SCA2 connector at the rear of the Module. To prevent bending the pins, Do NOT force the HDD into the SCA2 connector.
6. Ensure the HDD is firmly seated into the SCA2 connector.

## Removing and Installing the SCSI Cable, Terminator and Fan Module



### Caution



*To prevent damage to JP2 of the module, disconnect the fan power cable.*

*The fan must be removed before the SCSI Cable connector can be accessed.*

For illustration purposes only, the Hard Drive Module is not shown connected to the chassis. To remove or install a Hot Swappable Hard Drive Module 92mm Cooling Fan:

1. To prevent damage to JP2 of the module, disconnect the fan power cable.
2. Release the Fan Retaining Tab (2) with the thumb.
3. Pull the fan out of the frame at a 45° angle until it clears the retaining tab.
4. Remove the fan from the frame.
5. The fan must be removed before the SCSI Cable connector can be accessed.
6. To Install the fan, reverse the process. Do NOT force the fan into the frame.
7. Ensure the SCA2 SCSI Cable, CON7 connector and Terminator, CON6 connector match pin-1 to pin-1.



# Chapter 3

## Upgrading

### Tools and Supplies Needed

- ☐ Phillips (cross tip) screwdriver (#1 bit and #2 bit)
- ☐ Jumper removal tool, forceps or needle nosed pliers
- ☐ Pen or pencil
- ☐ Antistatic wrist strap and conductive foam pad (recommended)

### Warnings and Cautions

#### Warning



These warnings and cautions apply throughout this chapter. Only a Micron qualified technician should configure the server and server board.

**System Power On / Off:** The Power button DOES NOT turn the system AC Power OFF. To completely remove power from system, you must unplug the AC power cord from the wall outlet. Make sure the AC power cord is unplugged before you open the chassis to add or remove any components.

**Hazardous Conditions, Devices and Cables:** Hazardous electrical conditions may be present on power, telephone and communication cables. Turn power to the server OFF and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it. Otherwise, personal injury or equipment damage can result.

#### Caution



**Electrostatic discharge (ESD) and ESD protection:** ESD can damage hard disk drives, boards and other components. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your server when handling parts.

**ESD and handling boards:** Always handle boards carefully. They can be extremely sensitive to ESD. Hold the board only by the edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do NOT slide boards over any surface.

**Caution**

**Installing or Removing Jumpers:** A jumper is a small plastic encased conductor that slips over two jumper pins. Some jumpers have a small tab on top that you can grip with your fingertips, forceps or with a pair of fine needle nosed pliers. If your jumpers do not have such a tab, take care when using needle nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can damage the contacts inside the jumper, causing intermittent problems with the function controlled by that jumper. Take care to grip with, but not squeeze, the pliers or other tool you use to remove a jumper, or you may bend or break the stake pins on the board.

**Installing the Server Board****Caution**

The Server Board can be extremely sensitive to ESD and always requires careful handling. After removing it from the chassis, place it component side up on a nonconductive, static free surface to prevent shorting out the battery leads. If you place the Server Board on a conductive surface, the battery leads may short out. If they do, this will result in a loss of CMOS data and will drain the battery. Do NOT slide the Server Board over any surface.

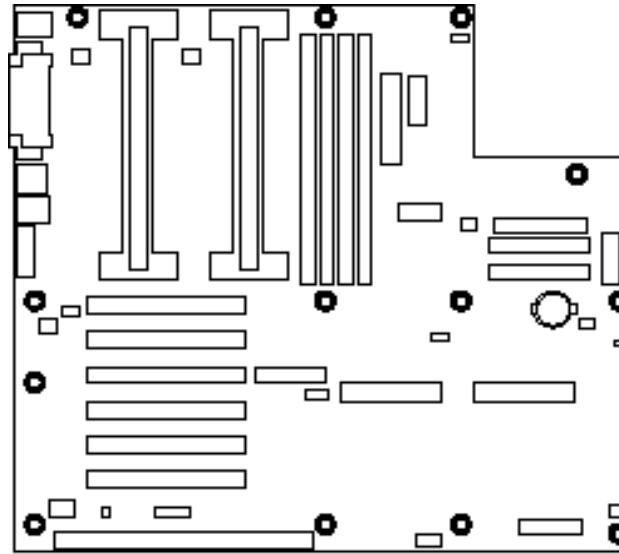
1. Observe the safety and ESD precautions outlined at the beginning of this chapter.
2. Insert screws through the mounting holes and into the threaded standoffs. Make sure the board is properly seated, and then tighten all the screws firmly.
3. Connect all internal cables to the server board.

**Note**

The floppy cable has been modified to support all floppy drives. The floppy drive connector on the cable (see connector label) is not keyed. Care should be taken to match pin 1 of the cable, indicated with a red stripe on the cable, with pin 1 of the floppy drive.

4. Reinstall add-in boards.
5. Connect all internal cables to add-in boards. Make sure you connect the power cables to the correct power connectors.
6. Connect all peripheral device cables to the I/O panel on the rear of the server.
7. Run the SSU to configure the server.

## Server Board Screw Hole Locations



## Removing the Server Board



*The server board can be extremely sensitive to ESD and always requires careful handling. After removing it from the server, place it component side up on a nonconductive, static free surface to prevent shorting out the battery leads. If you place the board on a conductive surface, the battery leads may short out. If they do, this will result in a loss of CMOS data and will drain the battery. Do not slide the server board over any surface.*

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Open the server and remove peripherals and components blocking access to the server board.
3. Label and disconnect all internal cables connected to add-in boards.
4. Remove all add-in boards.
5. Label and disconnect all internal cables connected to the server board.
6. Remove the server board retaining screws and set them aside.
7. Remove the server board, and place it component side up on a nonconductive, static free surface or in an antistatic bag.
8. If present, remove and save the EMI gasket that covers the I/O connectors on the board.

## Memory

### Removing DIMMs

Caution



*Use extreme care when removing a DIMM. Too much pressure can damage the socket or the Module. Apply only enough pressure on the plastic ejector levers to release the DIMM.*

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Open the server.
3. Gently push the plastic ejector levers out and down to eject a DIMM from its socket.
4. Hold the DIMM only by its edges, be careful not to touch its components or gold edge connectors. Carefully lift it away from the socket, and store it in an antistatic package.
5. Repeat to remove other DIMMs, as necessary.

### Installing DIMMs

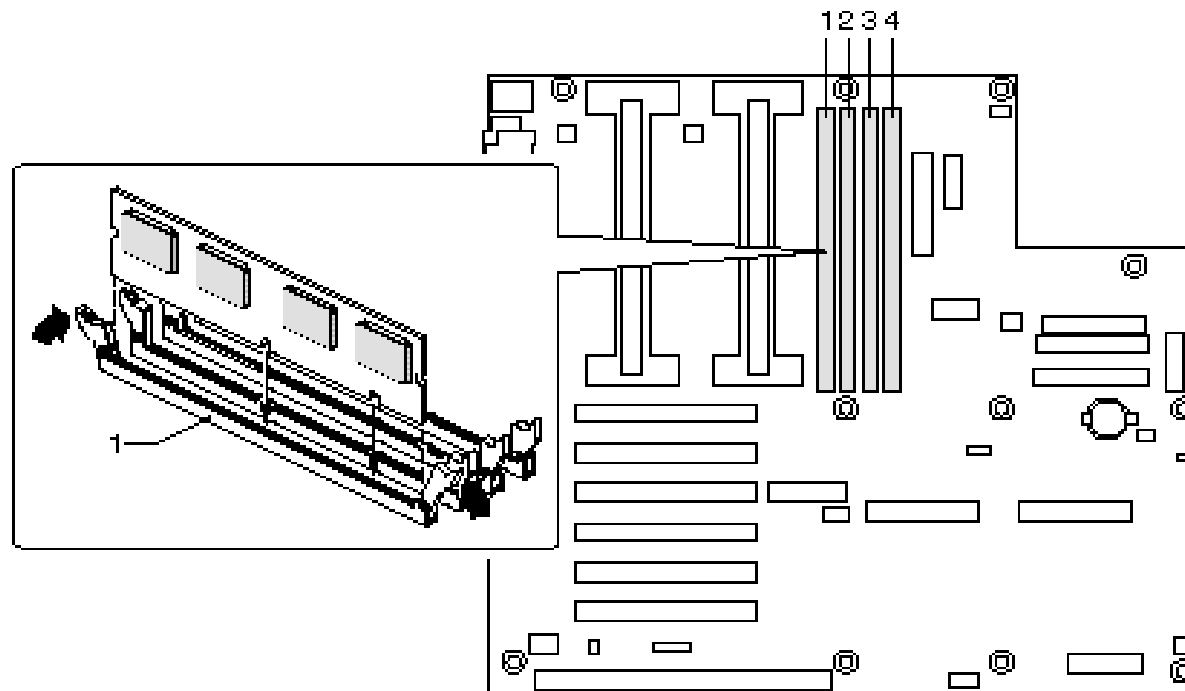
Caution



*Use extreme care when installing a DIMM module. Applying too much pressure can damage the socket or the module. DIMMs are keyed and can be inserted in only one way.*

*Mixing dissimilar metals may cause memory failures at a later date or may result in data corruption. Install DIMMs with gold-plated edge connectors in gold-plated sockets ONLY.*

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Open your server.
3. Holding the DIMM only by its edges, remove it from its antistatic package.
4. Orient the DIMM so that the two notches in the bottom edge of the DIMM align with the keyed socket.
5. Insert the bottom edge of the DIMM into the socket, and press down firmly on the DIMM until it seats correctly.
6. Gently push the plastic ejector levers on the socket ends to the upright position.
7. Repeat Steps 3 through 6 to install other DIMMs.



### Installing DIMMs (continued)

8. Close the server.
9. Connect all external cables and the power cord to the server.
10. Turn power to the monitor on and then apply power to the server.

### Processors

Warning



If the server has been running, any installed processor and heat sink on the processor board(s) will be hot. To avoid the possibility of a burn, be careful when removing or installing server board components that are located near the processors.

**Caution**

**Processor must be appropriate:** You may damage the server if you install a processor that is inappropriate for your server. Make sure your server can handle a newer, faster processor (thermal and power considerations). For exact information about processor interchangeability, contact your Micron Technical Support representative.

**Heat sink must be appropriate:** If you *REPLACE* the processor with a faster one, it must have a fan heat sink (powered fan instead of a passive heat sink). If you *ADD* a second processor, it must have a fan heat sink. When adding a processor, you must leave the existing one in the primary connector (closest to the center of the server board).

**ESD and handling processors:** Reduce the risk of electrostatic discharge (ESD) damage to the processor by doing the following: (1) Touch the metal chassis before touching the processor or server board. Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the processor. (2) Avoid moving around unnecessarily.

## Removing a Processor

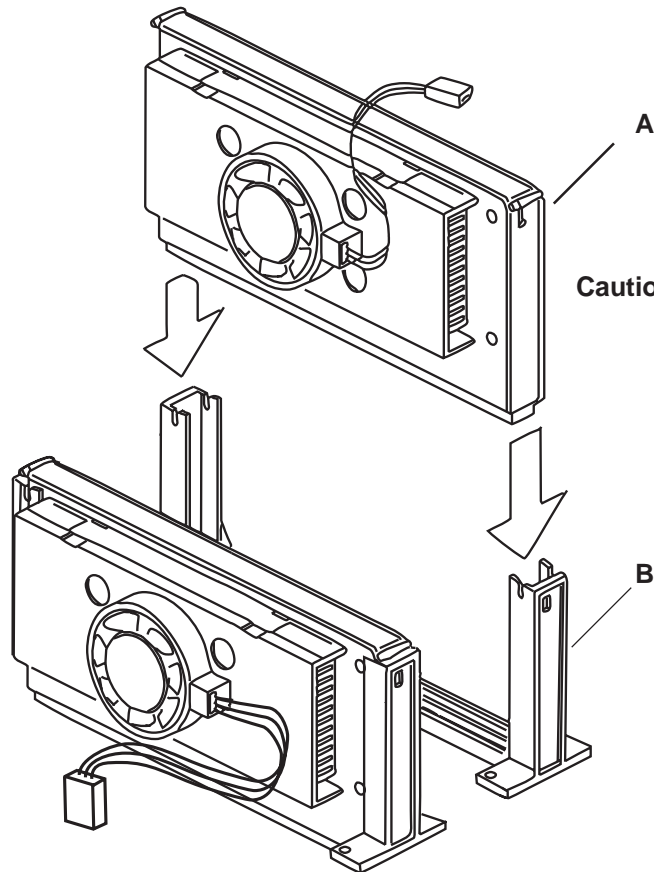
1. Observe the safety and ESD precautions at the beginning of this chapter and the additional cautions given here. If the processor has a fan heat sink, disconnect the power wire from the slot on the server board.
2. As you work, place boards and processors on a grounded, static free surface or conductive foam pad.
3. Carefully pull back the tab of the retention mechanism (B in figure 5) with your left hand until the processor can be rotated out of the slot. With your right hand, grasp the processor on the side closest to the retention mechanism tab you are pulling back on, and rotate the one side of the processor out of the slot. Once that side is free, you can pull the other side out of the slot.

**Caution**

**This is a difficult process.** Do *NOT* pull the tab of the retention mechanism back too far, as damage to either the retention mechanism or server board can occur. Pull the tab of the retention mechanism back just far enough for the retention lock to free the processor.

4. Put the processor in a piece of conductive foam and store in an antistatic package.

## Installing a Processor



A. Processor in Single Edge Contact cartridge  
B. Retention mechanism

Caution



**This is a difficult process.** Do NOT pull the tab of the retention mechanism back too far, as damage to either the retention mechanism or server board can occur. Pull the tab of the retention mechanism back just far enough for the retention lock to free the processor.

**The processor Grounded Retention Mechanisms (GRM) are NOT compatible with SECC type processor packaging.** If you must use SECC type processors, you must use the Universal Retention Mechanism (URM). URMs can be ordered through your [micronpc.com](http://micronpc.com) sales representative.

1. Observe the safety and ESD precautions at the beginning of this chapter and the additional cautions given here.
2. If your server has one processor and you are ADDING a second, then you must remove the termination card from the secondary processor slot. Carefully pull back the tab of the retention mechanism with your left hand until the processor can be rotated out of the slot. With your right hand, grasp the processor on the side closest to the retention mechanism tab you are pulling back on, and rotate the one side of the processor out of the slot. Once that side is free, you can pull the other side out of the slot.
3. If your server has one processor and you are REPLACING it, leave the termination board intact in the empty secondary slot. Remove the processor you want to replace.
4. If your server has two processors and you are REPLACING one or both, remove the appropriate one(s).
5. Remove the new processor from its antistatic package and place it on a grounded, static free surface or conductive foam pad.
6. Attach the small end of the power cable to the fan connector on the S.E.C. cartridge, then attach the large end to the 3-pin connector on the server board.

**Installing a Processor** (continued)

7. Orient the processor so that the heat sink faces the I/O connectors. Slide the processor into the retention mechanism. Push down firmly, with even pressure on both sides of the top, until the processor is seated.
8. After you have installed the processor, you must configure its speed in BIOS set-up.

**Replacing the Back up Battery**

The lithium battery on the server board powers the real time clock (RTC) for up to 10 years in the absence of power. When the battery starts to weaken, it loses voltage, and the server settings stored in CMOS RAM in the RTC (for example, the date and time) may be wrong. Contact your [micronpc.com](http://micronpc.com) sales representative for a list of approved devices.

**Warning**

**Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.**

**ADVARSEL!**

**Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.**

**ADVARSEL**

**Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.**

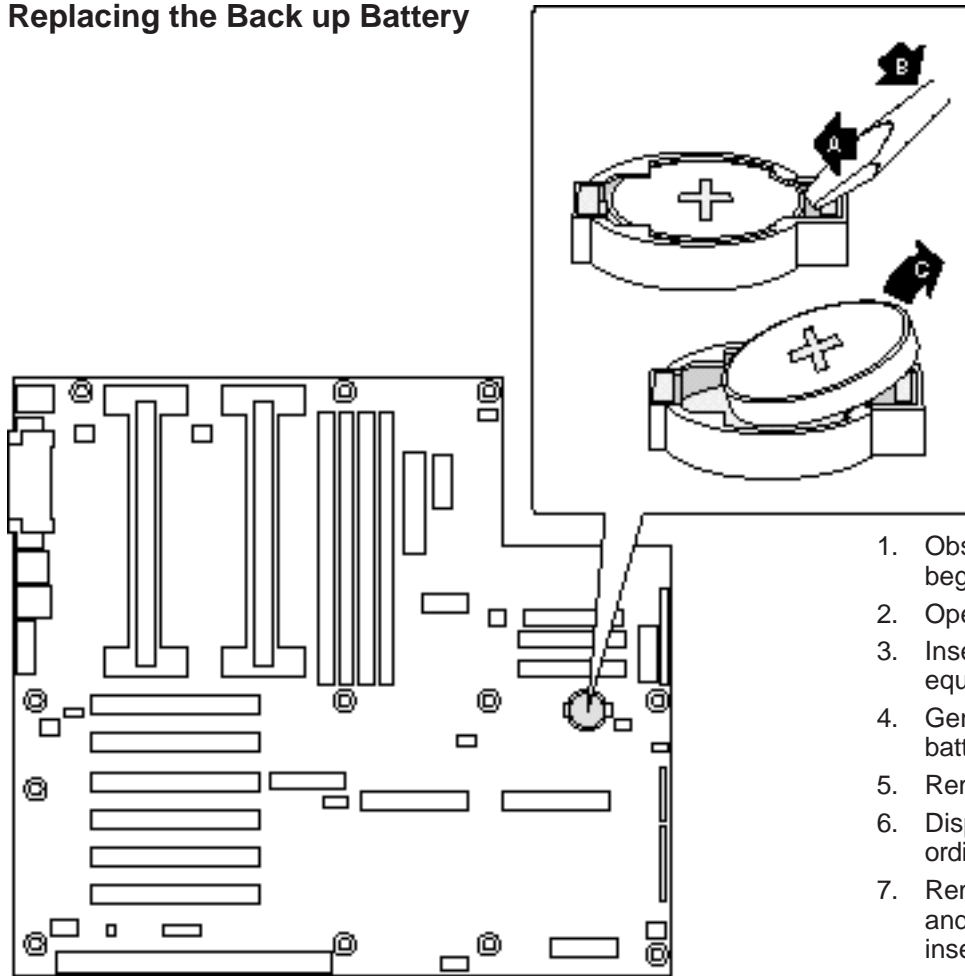
**VARNING**

**Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.**

**VAROITUS**

**Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.**

## Replacing the Back up Battery



1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Open the chassis.
3. Insert the tip of a small flat bladed screwdriver, or equivalent, under the tab in the plastic retainer.
4. Gently push down on the screwdriver to lift the battery.
5. Remove the battery from its socket.
6. Dispose of the battery according to local ordinance.
7. Remove the new lithium battery from its package, and, being careful to observe the correct polarity, insert it in the battery socket.
8. Reinstall the plastic retainer on the lithium battery socket.
9. Close the chassis.
10. Run the SSU to restore the configuration settings to the RTC.



# Chapter 4

## Configuration Software and Utilities

This chapter describes the Power On Self Test (POST) and server configuration utilities. The table below briefly describes the utilities.

### Configuration Utilities

| <u>Utility</u>                        | <u>Description and Brief Procedure</u>  |
|---------------------------------------|---|
| <b>BIOS Setup</b>                     | <p>If the system does not have a diskette drive, or the drive is disabled or misconfigured, use Setup to enable it.</p> <p>Or, you can move the CMOS jumper on the server board from the default setting (Protect CMOS memory) to the Clear setting; this will allow most server configurations to boot. For the procedure to do this, see the section "CMOS Jumper". Then run the SSU to configure the server.</p> |
| <b>System Setup Utility (SSU)</b>     | <p>Use for extended system configuration of onboard resources and add-in boards, and for viewing the system event log, setting boot device priority, or setting system security options.</p> <p>The SSU may be run from either the Server Configuration CD or from a DOS-bootable diskette.</p> <p>Information entered via the SSU overrides information entered via BIOS Setup.</p>                                |
| <b>EMP Console</b>                    | Use to access and monitor the server remotely.  |
| <b>FRU / SDR Load Utility</b>         | Use to update the Field Replacement Unit (FRU), Sensor Data Record (SDR) and Desktop Management Interface (DMI) flash components.   |
| <b>BIOS Update Utility</b>            | Use to update the BIOS or recover from a corrupted BIOS update.   |
| <b>Firmware Update Utility</b>        | Use to update BMC flash ROM.  |
| <b>Using the Adaptec SCSI Utility</b> | Use to configure or view the settings of the SCSI host adapters and onboard SCSI devices in the server.   |

## Hot Keys

Use the keyboard's numeric pad to enter numbers and symbols.

### To do this:

Clear memory and reload the operating system this is a system reset.

### Press these keys

<Ctrl+Alt+Del>

Secure your system immediately.

<Ctrl+Alt>+hotkey (Set your hot key combination with the SSU or Setup.)

## Power On Self Test (POST)

Each time you turn on the system, POST starts running. POST checks the server board, processor, memory, keyboard, and most installed peripheral devices. During the memory test, POST displays the amount of memory that it is able to access and test. The length of time needed to test memory depends on the amount of memory installed. POST is stored in flash memory.

1. Turn the monitor and then the server on. After a few seconds POST begins to run.

2. After the memory test, these screen prompts and messages appear:

```
Press <F2> key if you want to run SETUP
```

```
Keyboard.....Detected
```

```
Mouse.....Detected
```

3. If you do not press <F2> and do NOT have a device with an operating system loaded, the above message remains for a few seconds while the boot process continues, and the system beeps once. Then this message appears:

```
Operating system not found
```

If you do not press <F2> and DO have an operating system loaded, the boot process continues, and this message appears:

```
Press <Ctrl><A> to enter SCSI Utility
```

4. Press <Ctrl+A> if there are SCSI devices installed. When the utility opens, follow the displayed instructions to configure the onboard SCSI host adapter settings and to run the SCSI utilities. See "Using the Adaptec SCSI Utility". If you do not enter the SCSI utility, the boot process continues.
5. Press <Esc> during POST to pop up a boot menu when POST finishes. From this menu you can choose the boot device or enter BIOS Setup.

## Power On Self Test (POST)

(continued)

After POST completes, the system beeps once.

What appears on the screen after this depends on whether you have an operating system loaded and if so, which one.

If the system halts before POST completes running, it emits a beep code indicating a fatal system error that requires immediate attention. If POST can display a message on the video display screen, it causes the speaker to beep twice as the message appears.

Note the screen display and write down the beep code you hear; this information is useful for your service representative. For a listing of beep codes and error messages that POST can generate, see the "Solving Problems" chapter in this manual.

## Using BIOS Setup

This section describes the BIOS Setup options. Use Setup to change the server configuration defaults. You can run Setup with or without an operating system being present. Setup stores most of the configuration values in battery backed CMOS; the rest of the values are stored in flash memory. The values take effect when you boot the server. POST uses these values to configure the hardware; if the values and the actual hardware do not agree, POST generates an error message. You must then run Setup to specify the correct configuration.

**Run Setup:** You may run Setup to modify such server board feature as:

- ☐ Select diskette drive
- ☐ Select parallel port
- ☐ Select serial port
- ☐ Set time/date (to be stored in RTC)
- ☐ Configure IDE hard drive
- ☐ Specify boot device sequence
- ☐ Enable SCSI BIOS
- ☐ Specify processor speed

**Run SSU, not Setup:** You must run the SSU instead of Setup to do the following:

- ☐ Add or remove any ISA board that is not Plug and Play-compatible
- ☐ Enter or change information about a board
- ☐ Alter server resources (such as interrupts, memory addresses, I/O assignments) to user selected choices instead of choices selected by the BIOS resource manager

## Record the Setup Settings

## If You Cannot Access Setup

## Starting Setup

If the default values ever need to be restored (after a CMOS clear, for example), you must run Setup again. Referring to the worksheets could make your task easier.

If the diskette drive is mis-configured so that you cannot access it to run a utility from a diskette, you may need to clear CMOS memory. You will need to open the server, change a jumper setting, and use Setup to check the set diskette drive options, and then change the jumper back.

You can enter and start Setup under several conditions:

- ☐ When you turn on the server, after POST completes the memory test
- ☐ When you reboot the server by pressing <Ctrl+Alt+Del> while at the DOS operating system prompt
- ☐ When you have moved the CMOS jumper on the server board to the "Clear CMOS" position (enabled); for the procedure, see Chapter 5, under the heading "CMOS Jumper"

In the three conditions listed above, after rebooting, you will see this prompt:

```
Press <F2> to enter SETUP
```

In a fourth condition, when CMOS/NVRAM has been corrupted, you will see other prompts but not the <F2> prompt:

```
Warning:  cmos checksum invalid
Warning:  cmos time and date not set
```

In this condition, the BIOS will load default values for CMOS and attempt to boot.

## Using the Setup Menu

| <u>To</u>                           | <u>Press</u>    |
|-------------------------------------|-----------------|
| Get general help                    | <F1> or <Alt+H> |
| Move between menus                  | ← →             |
| Go to the previous item             | ↑               |
| Go to the next item                 | ↓               |
| Change the value of an item         | + or -          |
| Select an item or display a submenu | <Enter>         |
| Leave a submenu or exit Setup       | <Esc>           |
| Reset to Setup defaults             | <F9>            |
| Save and exit Setup                 | <F10>           |

**Using the Setup Menu** (continued)**When you see this:**

On screen, an option is shown but you cannot select it or move to that field.

On screen, the phrase Press Enter appears next to the option.

**What it means**

You cannot change or configure the option in that menu screen. Either the option is autoconfigured or autodetected, or you must use a different Setup screen, or you must use the SSU.

Press [Enter] to display a submenu that is either a separate full screen menu or a popup menu with one or more choices.

The rest of this section lists the features that display onscreen after you press **F2** to enter Setup. Not all of the option choices are described, because (1) a few are not user selectable but are displayed for your information, and (2) many of the choices are relatively self-explanatory.

You can make the following selections on the Main Menu itself. Use the submenus for other selections. Bolded items are the factory default settings.

**Main Menu**

| <b><u>Feature</u></b> | <b><u>Choices</u></b>  | <b><u>Description</u></b>             |
|-----------------------|--|---------------------------------------|
| System Time           | HH:MM:SS   | Sets the system time.                 |
| System Date           | MM/DD/YYYY   | Sets the system date.                 |
| Legacy Diskette A:    | Disabled<br>360KB<br>1.2 MB<br>720KB<br><b>1.44/1.25 MB</b><br>2.88 MB | Selects the diskette type.            |
| Legacy Diskette B:    | <b>Disabled</b><br>360KB<br>1.2 MB<br>720KB<br>1.44/1.25 MB<br>2.88 MB |                                       |
| Primary IDE Master    |  | Enters submenu.                       |
| Primary IDE Slave     |  | Enters submenu.                       |
| Secondary IDE Master  |  | Enters submenu.                       |
| Secondary IDE Slave   |  | Enters submenu.                       |
| Keyboard Features     |  | Enters submenu.                       |
| Processor Settings    |  | Enters submenu.                       |
| Language              | <b>English (US)</b><br>Français<br>Español<br>Deutsch<br>Italiano      | Selects which language BIOS displays. |

## Primary / Secondary IDE Master and Slave Submenu

| Feature           | Choices   | Description  | Feature               | Choices   | Description  |
|-------------------|---|--|-----------------------|---|--|
| Type              | <b>Auto</b><br><br>None<br><br>CD-ROM<br><br>IDE Removable<br><br>ATAPI Removable<br><br>User | Autoforces the server to attempt autodetection of the drive type.<br><br>None informs the server to ignore theis drive.<br><br>CD-ROM allows the manual entry of some fields described below.<br><br>IDE Removable allows the manual entry of some fields described below.<br><br>ATAPI Removable allows the manual entry of some fields described below.<br><br>User allows the manual entry of all fields described below. | Maximum Capacity      | N/A   | Computed size of drive from cylinders, heads, and sectors entered. This field is informational only.                           |
|                   |   |  | Multi-Sector Transfer | <b>Disabled</b><br>2, 4, 8, or 16 sectors   | Determines the number of sectors per block for multi-sector transfers. This field is informational only for Type Auto.         |
|                   |   |  | LBA Mode Control      | <b>Disabled</b><br>Enabled  | Enabling LBA causes logical block addressing to be used in place of cylinders. This field is informational only for Type Auto. |
|                   |   |  | 32 Bit I/O            | <b>Disabled</b><br>Enabled  | Enabling allows 32 bit IDE data transfers.   |
| <b>CHS Format</b> |   |  | Transfer Mode         | Standard<br>Fast PIO 1<br>Fast PIO 2<br>Fast PIO 3<br><b>Fast PIO 4</b><br>FPIO 3 / DMA 1<br>FPIO 4 / DMA 2 | Selects the method for moving data to and from the drive. This field is informational only for Type Auto.                      |
| Cylinders         | 0 to 65535  | Number of Cylinders on Drive.<br>This field is changeable only for Type User.  |                       |   |  |
| Heads             | 1 to 16   | Number of read/write heads on drive<br>This field is available only for Type User.   |                       |   |  |
| Sectors           | 0 to 63   | Number of sectors per track.<br>This field is available only for Type User.  | Ultra DMA Mode        | Disabled<br>Mode 0<br>Mode 1<br>Mode 2  | Selects the Ultra DMA mode used for moving data to and from the drive.   |

### Note




*Bolded items are the factory default settings.*

**Keyboard Submenu**

| <u>Feature</u>             | <u>Choices</u>  | <u>Description</u>   |
|----------------------------|---|--|
| Num Lock                   | On<br><b>Off</b>  | Selects the power on state for Num Lock.                                     |
| Key Click                  | <b>Disabled</b><br>Enabled  | Enables or disables the audible key click.                                   |
| Keyboard auto-repeat rate  | <b>30/sec</b><br>26.7/sec<br>21.8/sec<br>18.5/sec<br>13.3/sec<br>10/sec<br>6/sec<br>2/sec | Sets the numbers of time per second a key will repeat while it is held down. |
| Keyboard auto-repeat delay | 1/4 sec<br><b>1/2 sec</b><br>3/4 sec<br>1 sec   | Sets the delay before a key starts to repeat when it is held down.           |

**Processor Settings Submenu**

| <u>Feature</u>            | <u>Choices</u>   | <u>Description</u>   |
|---------------------------|--|--|
| CPU Speed Setting         | 350 MHz<br>400 MHz<br>450 MHz<br>500 MHz<br>550 MHz<br>600 MHz | Sets the speed for the installed processor(s)<br><b>Caution</b>  <i>Attempting to set this higher than the proper speed for the installed processor(s) may cause damage to the processor(s) or prevent the server from booting until a CMOS clear is preformed.</i> |
| CPU POST Speed Settings   | N/A  | This field is informational only.  |
| Processor Retest          | Yes<br><b>No</b>   | Yes tells BIOS to clear the historical processor status and retest all processors on the next boot. The BIOS automatically resets to No for the next boot.   |
| Memory Cache              | <b>Enabled</b><br>Disabled                                     | Enables processor cache.   |
| Processor 1 Stepping ID   | N/A  | This field is informational only.  |
| Processor 1 L2 Cache Size | N/A  | This field is informational only.  |
| Processor 2 Stepping ID   | N/A  | This field is informational only.  |
| Processor 2 L2 Cache Size | N/A  | This field is informational only.  |

## Advanced Menu


You can make the following selections on the Advanced Menu itself. Use the submenus for the three other selections that appear on the Advanced Menu.

| <u>Feature</u>                       | <u>Choices</u>             | <u>Description</u>  |
|--------------------------------------|----------------------------|---|
| Installed OS                         | <b>Other</b><br>Win95      | Select Win95 if you are booting a Plug and Play capable operating system.   |
| Reset Configuration Data             | <b>No</b><br>Yes           | Select Yes if you want to clear the server configuration data during the next boot. System automatically resets to No in next boot. |
| PCI Configuration                    |                            | Enters submenu.   |
| Integrated Peripherals Configuration |                            | Enters submenu.   |
| Advanced Chipset Control             |                            | Enters submenu.   |
| Use Multiprocessor Specification     | 1.1<br><b>1.4</b>          | Selects the version of multiprocessor specification to use.<br>Some operating systems do not support version 1.4                    |
| Large Disk Access Mode               | CHS<br><b>LBA</b>          | Select CHS if your OS is DOS. A large disk has more than 1024 cylinders, more than 16 heads or more than 63 tracks per sector.      |
| Delay on Option ROMs                 | <b>Disabled</b><br>Enabled | Forces a short delay at the end of each Option ROM scan.  |


## PCI Configuration Submenus

The PCI Configuration Menu contains selections that access other submenus.

### PCI Device, Embedded SCSI Submenu

| <u>Feature</u> | <u>Choices</u>  | <u>Description</u>   |
|----------------|---|--|
| Open ROM Scan  | <b>Enabled</b><br>Disabled  | Enables option ROM scan of the onboard SCSI chip.<br>There are 2 SCSI channels that are controlled by the same option ROM.   |
| Enable Master  | <b>Enabled</b><br>Disabled  | Enabled selects the device as a PCI bus master.  |
| Latency Timer  | Default<br>0020h<br><b>0040h</b><br>0060h<br>0080h<br>00A0h<br>00C0h<br>00E0h | Minimum guaranteed time, in units of PCI bus clocks, that a device may be master on a PCI bus.<br><br><b>Caution</b>  <i>Do NOT change this setting unless you fully understand the priority of this device on the PCI bus.</i> |

### PCI Device, Slot 1 - Slot 6 Submenus

| <u>Feature</u> | <u>Choices</u>  | <u>Description</u>  |
|----------------|---|---|
| Enable Master  | <b>Enabled</b><br>Disabled  | Enabled selects the device as a PCI bus master.   |
| Latency Timer  | Default<br>0020h<br><b>0040h</b><br>0060h<br>0080h<br>00A0h<br>00C0h<br>00E0h | Minimum guaranteed time, in units of PCI bus clocks, that a device may be master on a PCI bus.<br><br><b>Caution</b>  <i>Do NOT change this setting unless you fully understand the priority of this device on the PCI bus.</i> |

## Integrated Peripheral Configuration Submenu

| Feature          | Choices   | Description   | Feature                | Choices  | Description  |
|------------------|---|---|------------------------|--|--|
| COM1             | Disabled<br><b>Enabled</b><br>Auto<br><br>OS Controlled | Auto forces BIOS to configure the port.<br>OS Controlled Forces the OS to configure the port. | Parallel Port          | Disabled<br><b>Enabled</b><br>Auto<br><br>PnP OS   | Auto forces BIOS to configure the port.<br>PnP OS forces OS configures the port. |
| Base I/O Address | <b>3F8</b><br>2F8<br>3E8<br>2E8                         | Selects the base I/O address for COM 1.   | Mode                   | Output only<br>Bi-directional<br>EPP<br><b>ECP</b> | Selects parallel port mode.  |
| Interrupt        | IRQ 3<br><b>IRQ 4</b>                                   | Selects the IRQ for COM1.   | Base I/O Address       | <b>378</b><br>278                                  | Selects the base I/O address for LPT port.                                       |
| COM2             | Disabled<br><b>Enabled</b><br>Auto<br><br>PnP OS        | Auto forces BIOS to configure the port.<br>PnP OS forces OS configures the port.              | Interrupt              | <b>IRQ 5</b><br><b>IRQ 7</b>                       | Selects the IRQ for LPT port.  |
| Base I/O Address | 3F8<br><b>2F8</b><br>3E8<br>2E8                         | Selects the base I/O address for COM2.  | DMA channel            | <b>DMA 1</b><br>DMA 3                              | Selects the DMA for LPT port (only used for ECP mode).                           |
| Interrupt        | <b>IRQ 3</b><br>IRQ 4                                   | Selects the IRQ for COM2.   | Floppy disk controller | Disabled<br><b>Enabled</b>                         | Enables onboard diskette controller.   |

## Advanced Chipset Control

| Feature                | Choices                        | Description  | Feature         | Choices                    | Description  |
|------------------------|--------------------------------|--|-----------------|----------------------------|--|
| 640-768K Memory Region | <b>Enabled</b><br><br>Disabled | Enabled forwards ISA Master and DMA cycles to the PCI bus. Disabled forwards these cycles to memory. | Passive Release | <b>Enabled</b><br>Disabled | Enables the passive release mechanism on the PHOLD# signal when the PIIX4 is a PCI Master. |
| Delayed Transaction    | <b>Enabled</b><br>Disabled     | Enables the delayed transaction mechanism when the PIIX4e is the target of a PCI transaction.        |                 |                            |  |

## Security Menu

You can make the following selections on the Security Menu itself. Enabling the Supervisor Password field requires a password for entering Setup. The passwords are not case-sensitive.

| <u>Feature</u>          | <u>Choices</u>                 | <u>Description</u>  |
|-------------------------|--------------------------------|---|
| User Password is        | <b>Clear</b><br>Set            | Status only; user cannot modify. Once set, this can be disabled by setting it to a null string, or by clearing the password jumper on the server board.   |
| Supervisor Password is  | <b>Clear</b><br>Set            | Status only; user cannot modify.  |
| Set User Password       | Press Enter                    | When the <Enter> key is pressed, you are prompted for a password; press ESC key to abort. Once set, this can be cleared by setting it to a null string, or by clearing the password jumper on the server board. |
| Set Supervisor Password | Press Enter                    | When the <Enter> key is pressed, you are prompted for a password; press ESC key to abort. Once set, this can be cleared by setting it to a null string, or by clearing the password jumper on the server board. |
| Password on Boot        | <b>Disabled</b><br>Enabled     | Requires password entry before boot. System will remain in secure mode until password is entered. Password on Boot takes precedence over Secure Mode Boot.  |
| Fixed Disk Boot Sector  | <b>Normal</b><br>Write Protect | Write protects boot sector on Hard Disk to protect against viruses.   |

| <u>Feature</u>                   | <u>Choices</u>   | <u>Description</u>  |
|----------------------------------|--|---|
| Secure Mode                      | Disabled<br><b>1 min</b><br>2 min<br>5 min<br>10 min<br>20 min<br>1 hr<br>2 hr | Period of key/PS/2 mouse inactivity specified for secure mode to activate. A password is required for secure mode to function. Cannot be enabled unless at least one password is enabled. |
| Secure Mode Hot Key (Ctrl-Alt- ) | [ ]<br>{A, B, ..., Z}  | Key assigned to start the Quicklock feature. Cannot be enabled unless at least one password is enabled.   |
| Secure Mode Boot                 | <b>Disabled</b><br>Enabled   | System will boot in secure mode. You must enter a password to unlock the system. Cannot be enabled unless at least one password is enabled.   |
| Video Blanking                   | <b>Disabled</b><br>Enabled   | Blank video when secure mode is activated. You must enter a password to unlock the system. Cannot be enabled unless at least one password is enabled.                                     |
| Floppy Write Protect             | <b>Disabled</b><br>Enabled   | When secure mode is activated, the diskette drive is write protected. You must enter a password to disable. Cannot be enabled unless at least one password is enable.                     |
| Front Panel Lockout              | <b>Disabled</b><br>Enabled   | When secure mode is activated, the reset and power switches are locked. You must enter a password to unlock the system. Cannot be enabled unless at least one password is enabled.        |

## Server Menu

You can make the following selections on the Server Menu itself.

| <u>Feature</u>      | <u>Choices</u>                    | <u>Description</u>   |
|---------------------|-----------------------------------|--|
| System Management   |                                   | Enters submenu.  |
| Console Redirection |                                   | Enters submenu   |
| PEP Management      |                                   | Enters submenu   |
| Enable Sleep Button | <b>Disabled</b><br><b>Enabled</b> |  |
| PCI IRQs to IO-APIC | <b>Disabled</b><br><b>Enabled</b> | Enabled - BIOS can describe all 24 IO APIC pins in the MP table for PCI interrupts. Not all MP operating systems and drivers can understand this description of the interrupts in the MP table.<br>Disabled - BIOS will only use 16 IO APIC pins in the MP table for PCI interrupts. All PCI interrupts are routed to a standard ISA IRQ pins on IO APIC. ALL operating systems will work with standard ISA IRQ entries. |
| Processor Reset     | <b>Yes</b><br><b>No</b>           | Yes tells BIOS to clear the historical processor status and retest all processors on the next boot. BIOS automatically resets to No in next boot.  |
| Assert NMI on PEER  | <b>Disabled</b><br><b>Enabled</b> | Enabled generates an NMI on a parity error (PEER). To activate this feature, the system error (SERR) option must be enabled.   |
| Assert NMI on SEER  | <b>Disabled</b><br><b>Enabled</b> | Enabled generates an NMI on SEER   |

## System Management Submenu

| <u>Feature</u>             | <u>Choices</u>                    | <u>Description</u>   |
|----------------------------|-----------------------------------|--|
| Server Management Info     |                                   | Enters submenu   |
| System Event Logging       | <b>Disabled</b><br><b>Enabled</b> | When enabled, system events will be logged by BIOS and BMC in system event log.  |
| Clear Event Log            | <b>No</b><br><b>Yes</b>           | Yes clears the system event log (SEL) in BMC. BIOS automatically resets to NO for next boot.   |
| EMP Password switch        | <b>Disabled</b><br><b>Enabled</b> | Sets the EMP password.   |
| EMP Password               | [A..Z, 0..9]                      | This field only shows up when the EMP password switch is enabled. Entering a password and pressing return will send the password immediately to the BMC. If a beep is heard the password was not accepted. If no password is entered, anyone has access to the server through the EMP Console. |
| EMP Escape sequence        | +++                               | Sets the escape sequence for the modem being used for EMP. This will force the modem to command mode. This is only used if the EMP direct connect/modem mode is set to modem.  |
| EMP Hangup Line String     | <b>ATH</b>                        | Sets the Hangup Line Sequence for the modem being used for EMP. Used in EMP modem mode.  |
| EMP Restricted Mode Access | <b>Disabled</b><br><b>Enabled</b> | If set to Enabled, Power on/off and Reset server controls via EMP are no longer available.   |

continued

**System Management Submenu** (continued)

| <b>Feature</b>                | <b>Choices</b>  | <b>Description</b>  |
|-------------------------------|---|---|
| Modem Init String             | <b>AT&amp;F0S0=1S14=0&amp;D</b>                           | Sets the initialization string for the String modem being used for EMP. Used in EMP modem mode.<br><br>This field is only 16 characters long. The High Modem Init String field is a continuation of the Modem Init string so you can enter in another 4 characters.   |
| High Modem Init String        | <b>0</b>  | This is a continuation of the Modem Init String. When 16 characters are typed into the Modem Init String field, this field will appear to allow another 4 characters to be typed in.  |
| EMP Access                    | <b>Pre-boot Only</b><br><br>Always Active<br><br>Disabled | EMP is only enabled during power down through end of POST. COM2 is returned to system use at the end of POST when operating system boots.<br>EMP is always enabled. COM2 cannot be used by operating system. It is now dedicated for EMP use.<br>EMP is Disabled. COM2 is always available for system use by console redirection or operating system. |
| EMP Direct Connect/Modem Mode | Direct Connect<br><br><b>Modem Mode</b>                   | Sets how EMP connects to the server. Direct Connect means a null modem serial cable directly connects COM2 connector port to the EMP console machine.<br>Indicates that a modem is connected on COM2 for EMP use.   |

**Server Management Information Submenu**

Items on this menu are set when the server board is manufactured and cannot normally be changed. The last two items refer to the firmware level of the BMC on the server board and HSC (Hot Swap Controller). If circumstances require a change in the L44GX+ server board's firmware, specific direction will be provided by Micron Technical Support.

| <b>Feature</b>        | <b>Choices</b> | <b>Description</b>     |
|-----------------------|----------------|------------------------|
| Board Part Number     | N/A            | Information field only |
| Board Serial Number   | N/A            | Information field only |
| System Part Number    | N/A            | Information field only |
| System Serial Number  | N/A            | Information field only |
| Chassis Part Number   | N/A            | Information field only |
| Chassis Serial Number | N/A            | Information field only |
| BMC Revision          | N/A            | Information field only |
| Primary HSB Revision  | N/A            | Information field only |

### Console Redirection Submenu

| Feature          | Choices   | Description  |
|------------------|---|--|
| COM Port Address | <b>Disabled</b>   | When Enabled, console redirection uses the I/O Port specified.   |
|                  | 3F8   | Typically COM1   |
|                  | 2F8   | Typically COM2   |
|                  | 3E8   | All keyboard/mouse and video functions will be directed to this port. This is designed to be used only under DOS in Text Mode. |
| IRQ #            | N/A   | Information field only   |
| Baud Rate        | 9600<br><b>19.2k</b><br>38.4k<br>115.2k                       | When console redirection is Enabled, specifies the Baud Rate to be used.   |
| Flow Control     | No Flow Control<br>CTS/RTS<br>XON/XOFF<br><b>CTS/RTS + CD</b> | None disallows flow control.<br>Hardware-flow control.<br>Software-flow control.<br>Hardware plus carrier-detect flow control  |

### PEP Management Submenu

Verify in the BIOS Set-up for the server board whether or not the system BIOS includes PEP. If not, when it becomes available, you can download it from the Micron Web Site: [www.micronpc.com](http://www.micronpc.com)

| Feature             | Choices           | Description   |
|---------------------|-------------------|---|
| PEP Filter Events   |                   | Enters submenu  |
| PEP Enable          | Disable<br>Enable | Enables Platform Event Paging   |
| PEP Blackout Period | [0...9]           | Sets the amount of time between pages in minutes. Valid range is from 0 to 10.  |
| PEP Page String     |                   | Sets the string used to page you. Generally this is the attention command for your modem, followed by the number of your paging service, followed by the message you want to appear on the pager, followed by a modem hang-up command. Use commas for 1-second pauses.<br>This field is only 16 characters long. The 16-31, 32-47 and 48-63 fields are a continuation of the PEP Page String Field so you can enter in another 48 characters for 64 characters total. |
| 16 - 31             |                   | This is a continuation of the PEP Page String Field. When 16 characters are typed into the Modem Init String field, this field will appear to allow another 16 characters to be typed in.   |

**PEP Management Submenu** (continued)

| <b>Feature</b> | <b>Choices</b>                              | <b>Description</b>   |
|----------------|---|--|
| 32 - 47        |   | This is a continuation of the PEP Page String Field. When 16 characters are typed into the Block #1 field, this field will appear to allow another 16 characters to be typed in. |
| 48 - 63        |   | This is a continuation of the PEP Page String Field. When 16 characters are typed into the Block #2 field, this field will appear to allow another 16 characters to be typed in. |
| Send Test      | <b>Press Enter</b><br>Send Test<br>Page Now | To send a test page, select "Send Test Page Now" from the popup menu.  |

**PEP Filter Submenu**

This submenu allows you to set which events or error conditions cause the system to page you.

| <b>Feature</b>       | <b>Choices</b>             | <b>Description</b>   |
|----------------------|----------------------------|--|
| PEF Enable           | <b>Disabled</b><br>Enabled | Enables the Platform Event Filter. If this is enabled, and one of the events you enable below occurs, the server will automatically page you using the Page String (NV) information. |
| Temperature Sensor   | <b>Disabled</b><br>Enabled |  |
| Voltage Sensor       | <b>Disabled</b><br>Enabled |  |
| Fan Sensor           | <b>Disabled</b><br>Enabled |  |
| Chassis Sensor       | <b>Disabled</b><br>Enabled |  |
| Power Supply         | <b>Disabled</b><br>Enabled |  |
| BIOS SMI Handle      | <b>Disabled</b><br>Enabled |  |
| BIOS POST            | <b>Disabled</b><br>Enabled |  |
| FRB Sensor           | <b>Disabled</b><br>Enabled |  |
| Fatal NMI            | <b>Disabled</b><br>Enabled |  |
| Watchdog Timer Reset | <b>Disabled</b><br>Enabled |  |
| System Reset         | <b>Disabled</b><br>Enabled |  |

## Boot Menu

You can make the following selections on the Boot Menu itself.

| <u>Feature</u>              | <u>Choices</u>      | <u>Description</u> |
|-----------------------------|---------------------|--------------------|
| Boot-time Diagnostic Screen | Disabled<br>Enabled |                    |
| Boot Device Priority        |                     | Enters submenu     |
| Hard Drive                  |                     | Enters submenu     |
| Removable Devices           |                     | Enters submenu     |

## Boot Device Priority Submenu

Use the up or down arrow keys to select a device; then press the <+> or <-> keys to move the device higher or lower in the boot priority list.

| <u>Feature</u>       | <u>Choices</u>    | <u>Description</u>                             |
|----------------------|-------------------|--|
| <i>Boot Priority</i> | <i>Devices</i>    |  |
| 1                    | Removable Devices | Attempts to boot from a Removable Media Device |
| 2                    | Hard Disk Drive   | Attempts to boot from a Hard Disk Drive Device |
| 3                    | ATAPI CD-ROM      | Attempts to boot from an ATAPI CD-ROM Device   |
| 4                    | LANDesk (R)       | Attempts to boot from the Local Area Network   |

## Removable Devices Submenu

For options on this menu, use the up or down arrow keys to select a device, then press the <+> or <-> keys to move the device higher or lower in the boot priority list.

| <u>Option</u>          | <u>Description</u>  |
|------------------------|---|
| 1. Legacy Floppy Drive | Refers to the onboard 3.5-inch floppy drive.<br><br>Removable IDE media may also show up here if the removable media was formatted in floppy emulation. |

## Hard Drive Submenu

For options on this menu, use the up or down arrow keys to select a device, then press the <+> or <-> keys to move the device higher or lower in the boot priority list.

| <u>Option</u>                          | <u>Description</u>   |
|--|--|
| 1. Hard Drive (or actual drive string) | IDE drives will have a suffix attached to the drive ID string.<br>PM - hard drive on Primary Master Channel<br>PS - hard drive on Primary Slave Channel<br>SM - hard drive on Secondary Master Channel<br>SS - hard drive on Secondary Slave Channel<br><br>SCSI CD-ROMs may be displayed here because the onboard SCSI BIOS treats CD-ROMs as hard drives.<br><br>SCSI ZIP or removable drives may also appear here.<br><br>Removable IDE ZIP drives will only show up if the removable media is formatted as a hard drive. |
| 2. Other                               | Covers all the boot devices that are not reported to the system BIOS through the BIOS boot specification mechanism. This includes all PCI cards that are not BIOS boot compliant (legacy) as well as ISA cards that are not PnP compliant. ISA legacy cards will boot first before non BIOS boot compliant PCI cards (in scan order from lowest slot to highest).  |

## Exit Menu

You can make the following selections on the Exit Menu. Select an option using the up or down arrow keys; then press <Enter> to execute the option. Pressing <Esc> does not exit this menu. You must select one of the items from the menu or menu bar to exit.

| <b>Choices</b>          | <b>Description</b>   |
|-------------------------|--|
| Exit Saving Changes     | Exits after writing all modified Setup item values to NVRAM            |
| Exit Discarding Changes | Exits leaving NVRAM unmodified.  |
| Load Setup Defaults     | Loads values of all Setup items from previously saved custom defaults. |
| Load Custom Defaults    | Loads default values for all Setup items.                              |
| Save Custom Defaults    | Saves present Setup values to custom defaults.                         |
| Discard Changes         | Reads previous values of all Setup items from NVRAM                    |
| Save Changes            | Writes all Setup item values to NVRAM                                  |

## Using the System Setup Utility

The System Setup Utility (SSU) is on the L440GX+ Server Board Resource software CD shipped with the server board. The SSU provides a graphical user interface (GUI) over an extensible framework for server configuration. For the L440GX+ systems, the SSU framework supports the following functions and capabilities:

- ☐ Assigns resources to baseboard devices and add-in cards prior to loading the operating system (OS).
- ☐ Allows you to specify boot device order and system security options.
- ☐ Permits viewing and clearing of the system's critical event log.
- ☐ Allows troubleshooting of the server when the OS is not operational.
- ☐ Provides a system level view of the server's I/O devices.

## When to Run the System Setup Utility

The SSU is a DOS-based utility that supports extended system configuration operations for onboard resources and add-in boards. You can view the system event log and set system boot and security options. Use the SSU when you need to

- ☐ Add and remove boards affecting the assignment of resources (ports, memory, IRQs, DMA).
- ☐ Modify the server's boot device order or security settings.
- ☐ Change the server configuration settings.
- ☐ Save the server configuration.
- ☐ View or clear the system event log.

## When to Run the System Setup Utility (continued)

If you install or remove an ISA add-in board, you must run the SSU to reconfigure the server. Running the SSU is optional for PCI and Plug and Play ISA add-in boards.

The SSU is PCI aware, and it complies with the ISA Plug and Play specifications. The SSU works with any compliant configuration (.CFG) files supplied by the peripheral device manufacturer.

The I/O baseboard comes with a .CFG file. The .CFG file describes the characteristics of the board and the system resources that it requires. The configuration registers on PCI and ISA Plug and Play add-in boards contain the same type of information that is in a .CFG file. Some ISA boards also come with a .CFG file.

The SSU uses the information provided by .CFG files, configuration registers, flash, and the information that you enter, to specify a system configuration. The SSU writes the configuration information to flash memory.

The SSU stores configuration values in flash memory. These values take effect when you boot the server. POST checks the values against the actual hardware configuration; if they do not agree, POST generates an error message. You must then run the SSU to specify the correct configuration before the server boots.

The SSU always includes a checksum with the configuration data so the BIOS can detect any potential data corruption before the actual hardware configuration takes place.

## What You Need to Do

The SSU may be run directly from the Server Resource CD by booting the server system to the CD and selecting "Utilities" or from a set of DOS diskettes.

If you choose to run the SSU from a set of DOS diskettes, you must create the SSU diskettes from the Server Resource CD by booting to the CD and selecting "Create Diskettes." Alternatively, if you have a Windows 95 or Windows NT<sup>®</sup> workstation, you can insert the CD into that system and create diskettes from the "Utilities" menu of the graphical user interface.

If your diskette drive is disabled, or improperly configured, you must use the flash resident Setup utility to enable it so that you can use the SSU. If necessary, you can disable the drive after you exit the SSU. Information entered using the SSU overrides any entered using Setup.

## Setting up to Run the SSU

### Running the SSU Locally

Running the ssu.bat file provided on the SSU media starts the SSU. If the server boots directly from the SSU media, the ssu.bat file is automatically run. If it boots from a different media, the SSU can be started manually or by another application. When the SSU starts in the local execution mode (the default mode), the SSU accepts input from the keyboard and/or mouse. The SSU presents a VGA based Graphical User Interface (GUI) on the primary monitor.

The SSU runs from writable, nonwritable, removable, and nonremovable media. If the SSU is run from nonwritable media, user preference settings (such as screen colors) can not be saved.

The SSU supports the ROM-DOS V6.22 operating system. It may run on other ROM-DOS-compatible operating systems but they are not supported. The SSU will not operate from a "DOS box" running under an operating system such as Windows.

### Running the SSU Remotely

Running the SSU remotely requires a remote server with a LANdesk Server Monitor Module 2 (SMM2) card and a local system with Remote Control software available.

The SMM2 card provides video memory, keyboard and mouse redirection support for the remote server. The Remote Control console of the local system displays and sends video memory and user input to the remote server through either a modem or an Ethernet link. Because the SSU runs exclusively on the remote server, any files required for the SSU to run must be available on the remote server (on removable or nonremovable media).

If you connect the local system to the remote server through a network or modem you can see the console, control the mouse and control the keyboard of the remote server.

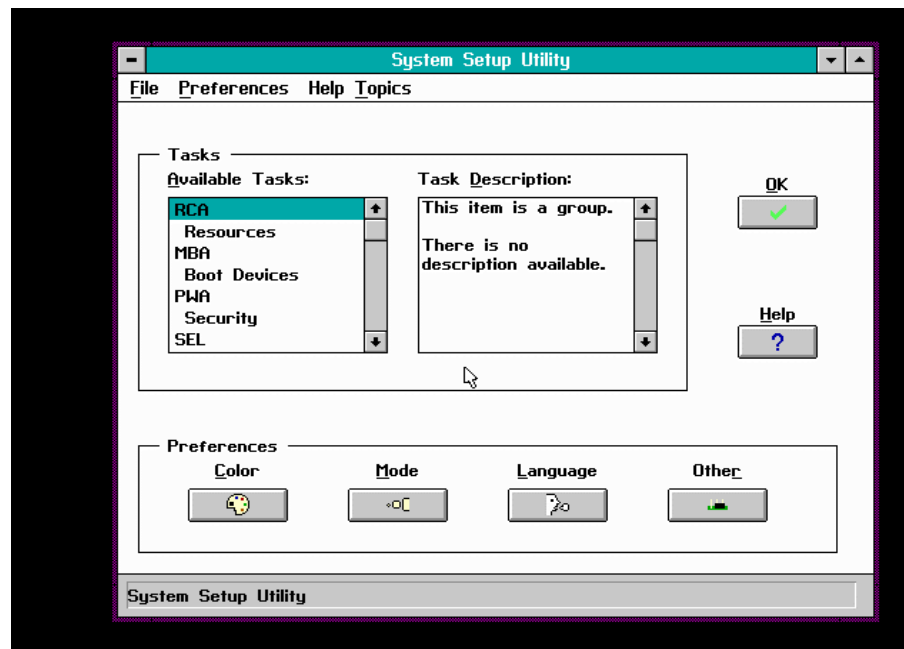
### Starting the SSU

SSU consists of a collection of task oriented modules plugged into a common framework called the Application Framework (AF). The Application Framework provides a launching point for individual tasks and a location for setting customization information. For full functionality, the SSU requires the availability of the AF.INI, AF.HLP, plus any .ADN files, and their associated .HLP and .INI files.

1. Turn the monitor ON and then apply power to the system.
2. There are two ways to start the SSU.
  - a. After creating set of three SSU diskettes from the CD: Insert the first SSU diskette in drive A, and press the reset button or <Ctrl+Alt+Del> to reboot your server from the diskette.

**Starting the SSU** (continued)

- b. Directly from the Server Resource CD: Insert the Server Resource CD into your CD-ROM drive and press the reset button or <Ctrl-Alt-Del> to reboot. When prompted to do so, press <F2> to enter BIOS Setup. From the Boot Menu, select the Boot Device Priority option and then select CD-ROM as your primary boot device. Save those settings and exit the BIOS Setup. The server will boot from the CD-ROM and display a menu of options. Follow the instructions in the menu to start the SSU.
3. When the SSU title appears on the screen, press <Enter> to continue.
4. The mouse driver loads if it is available; press <Enter> to continue.
5. This message appears:  
Please wait while the Application Framework loads....
6. When the main window of the SSU appears, you can customize the user interface before continuing.

**System Setup Utility Main Window**

## Customizing the SSU

The SSU lets you customize the user interface according to your preferences. The AF sets these preferences and saves them in the AF.INI file so that they take effect the next time you start the SSU. There are four user customizable settings:

- ☐ **Color** - this button lets you change the default colors associated with different items on the screen with predefined color combinations. The color changes are instantaneous.
- ☐ **Mode** - this button lets you set the desired expertise level.
  - novice
  - intermediate
  - expert

The expertise level determines which tasks are visible in the Available Tasks section and what actions each task performs. For a new mode setting to take effect, you must exit the SSU and restart it.
- ☐ **Language** - this button lets you change the strings in the SSU to strings of the appropriate language. For a new language setting to take effect, you must exit the SSU and restart it.
- ☐ **Other** - this button lets you change other miscellaneous options in the SSU. The changes take effect immediately.

## To Change the Interface Default Values

- ☐ Use the mouse to click on the proper button in the Preferences section of the SSU Main window.
- or**
- ☐ Use the tab and arrow keys to highlight the desired button, and press the spacebar or Enter.
- or**
- ☐ Access the menu bar with the mouse or hot keys (Alt + underlined letter).

### Note



*If you run the SSU from nonwritable media (like a CD-ROM), these preferences will be lost when you exit the SSU.*

## Launching a Task

It is possible to have many tasks open at the same time, although some tasks may require complete control to avoid possible conflicts. The tasks achieve complete control by keeping the task as the center of operation until you close the task window.

### To Launch a Task

- ☐ In the SSU Main window, double click on the task name under Available Tasks to display the main window for the selected task.
- or**
- ☐ Highlight the task name, and click on OK.
- or**
- ☐ Use the tab and arrow keys to highlight the desired button, and press the spacebar or Enter.

## Resource Configuration Add-in (RCA) Window

The Resource Configuration Add-in (RCA) provides three major functions:

- ☐ Creates representations of devices that cannot be discovered by the system (ISA cards).
- ☐ Modifies the contents of the system by adding and removing devices.
- ☐ Modifies the resources used by devices.

You can use the RCA window to define an ISA card or add an ISA card by clicking on the appropriate button. Removing an ISA card requires that the card be highlighted in the Devices section of the screen before clicking on the button. You can only add as many ISA cards as you have ISA slots available.

1. From the SSU main window, launch the RCA by selecting the "Resources" task under the RCA heading in the task box.
2. When the RCA window appears, it displays messages similar to the following:

```
Baseboard:Server board Server board
PCI Card: Bus 00 dev 00 -- Host Processor Bridge
PCI Card: Bus 00 dev 0D -- Multifunction Controller
PCI Card: Bus 00 dev 0F -- Ethernet Controller
PCI Card: Bus 00 dev 12 -- Multifunction Controller
PCI Card: Bus 00 dev 14 -- VGA Controller
```

3. To configure a device, select its name in the Devices section of the RCA window, and press the spacebar or [Enter], or click on it.

### Resource Configuration Add-in (RCA) Window (continued)

4. It is possible to close the RCA window and return to the AF by clicking on the Close button. Any changes made will be kept in memory for use by the RCA when it is rerun.
5. Save all the changes made by clicking on the Save button. Saving writes your current configuration to nonvolatile storage where it will be available to the system after every reboot.
6. Closing the window by clicking on the system menu, the dash in the upper left corner, discards all changes.

### Defining an ISA Card

An ISA card usually comes with a vendor created .CFG file that specifies the resources the card requires to function properly. If the .CFG file is unavailable, you must manually create it or define the card through the SSU. Defining an ISA card consists of specifying the name of the card and the resources it consumes. This allows the RCA to consider the ISA card resource requirements when the RCA tries to resolve conflicts. The information is also used by the system BIOS to configure the hardware when the system is booted.

1. To add or remove ISA card resources, click on the appropriate resource buttons, select the desired value, and click on Add or Remove.
2. After you complete the necessary information, click on Save.
3. To edit a card, click on Load to retrieve the card information. After making changes, click on Save.
4. To create a card, click on New.
5. To remove a current definition of a card, click on Delete.

### Adding and Removing ISA Cards

Adding and removing ISA cards through the RCA provides a way for the RCA to run its conflict detection algorithms on the resources requested by the cards. This alerts you to any possible problems with that particular card in the current configuration.

#### To Add an ISA Card:

1. Click on Add ISA Card in the RCA window.
2. Specify the directory for the .CFG file.
3. Select the file and click on Ok.

#### To Remove an ISA Card:

1. Select a valid ISA card in the Devices section of the RCA window.
2. Click on Remove ISA Card.

## Modifying Resources

Modifying the resources of a device may be necessary to accommodate certain operating systems, applications and drivers. It may also be necessary to modify resources to resolve a conflict.

### To Modify the Resources Associated with a Device

1. Highlight the device in the Devices section of the RCA window.
2. Press the spacebar or <Enter>, or double click on the entry.

This displays the functions of the selected device along with possible choices and the resources associated with those choices.

### To Make a Modification

1. Highlight the function in the Configuration window.
2. Press the spacebar or <Enter> or double click on the entry (this updates the Choice and resource lists).
3. Press the Tab key to get to the Choice list, and press <Enter>.
4. Use the arrow keys to select a proper choice, and press <Enter> again.
5. If the choice allows multiple possible values for a particular resource, use the hot key to select a resource, and press the spacebar or double click on the resource.
6. Select the desired resource, and click on OK.

## System Resource Usage

Clicking on the Resource Use button in the Configuration window displays the System Resource Usage screen. This screen shows what resources each device is consuming. This information is useful for choosing resources if a conflict occurs. Devices can be organized according to the resources you want to examine using the options in the Resource section of the screen. The resource information can also be written to a plain text file through this window.

## Multiboot Options Add-in

Under this window, you can change the boot priority of a device.

1. Select a device.
2. Press the + button to move it up in the list. Press the - button to move it down.

## Security Add-in

Under this window, you can set the User and Administrator passwords, and Security options.

### To Set the User Password

1. Click on the user password button.
2. Enter the password in the first field.
3. Confirm the password by entering it again in the second field.

### To Change or Clear the User Password

1. Click on the User password button.
2. Enter the old password in the first field.
3. Enter the new password in the second field (or leave blank to clear).
4. Confirm the password by entering it again in the second field (or leave blank to clear).

### To Set the Administrator Password

1. Click on the Administrator password button.
2. Enter the password in the first field.
3. Confirm the password by entering it again in the second field.

### To Change or Clear the Administrator Password

1. Click on the Administrator password button.
2. Enter the old password in the first field.
3. Enter the new password in the second field (or leave blank to clear).
4. Confirm the password by entering it again in the second field (or leave blank to clear).

## Security Options

Under this window, you can set the other security options:

- ☐ **Hot Key** - Set a key sequence that, when pressed, will drop the server into secure mode.
- ☐ **Lock-Out Timer** - Set an interval that, if no activity takes place during it, will drop the server into secure mode.
- ☐ **Secure Boot Mode** - Force the server to boot directly into secure mode.
- ☐ **Video Blanking** - Turn the video off when the server is in secure mode.
- ☐ **Floppy Write** - Control access to the diskette drive while the server is in secure mode.
- ☐ **Reset / Power Switch Locking** - Control the power and reset buttons while the server is in secure mode.

## SEL Manager Add-in

Clicking on the SEL Manager Add-in task brings up the Server Event Log (SEL) viewer. You can load and view the current SEL data stored in the BMC, save the currently loaded SEL data to a file, view previously saved SEL data, or clear the SEL. The SEL Viewer has the following menus:

### File

The File menu has the following options:

- ☐ **Load SEL...** — View data from a previously saved SEL file.
- ☐ **Save SEL...** — Save the currently loaded SEL data to a file.
- ☐ **Clear SEL** — Clears the SEL data from the BMC.
- ☐ **Exit** — Quits the SEL Viewer.

### View

The View menu has the following options:

- ☐ **SEL Info** — Displays information about the SEL. These fields are display only.
- ☐ **All Events** — Displays the current SEL data from the BMC.
- ☐ **By Sensor** — Brings up a pop-up menu that allows you to view only the data from a certain sensor type.
- ☐ **By Event** — Brings up a pop-up menu that allows you to view only the data from a certain event type.

### Settings

The Settings menu has the following options:

- ☐ **Display HEX / Verbose** — Toggles between the Hex/interpreted mode of displaying the SEL records.
- ☐ **Output Text / Binary** — Determines whether SEL data will be saved to the file (as under File - Save) in binary format or verbose format.

### Help

The Help menu has the following option:

- ☐ **About** — Displays the SEL Viewer version information.

## FRU Manager Add-in

Clicking on the FRU Manager Add-in task brings up the Field Replaceable Unit (FRU) viewer. You can load and view the current FRU data stored in the BMC, save the currently loaded FRU data to a file or view previously saved FRU data. The FRU Viewer has the following menus:

### File

The File menu has the following options:

- ☐ **Load...** — View data from a previously saved FRU file.
- ☐ **Save...** — Saves the currently loaded FRU data to a file.
- ☐ **Save As...** — Saves the currently loaded FRU data to a file.
- ☐ **Exit** — Quits the FRU Viewer.

### View

The View menu has the following options:

- ☐ **FRU Info** — Displays information about the FRU. These fields are display only.
- ☐ **All FRU Areas** — Displays the current FRU data from the BMC.
- ☐ **By Device Type** — Brings up a pop-up menu that allows you to view only the data from a certain device type.

### Settings

The Settings menu has the following options:

- ☐ **Display HEX / Verbose** — Toggles between the Hex / interpreted mode of displaying the FRU records.
- ☐ **Output Text / Binary** — Determines whether FRU data will be saved to the file (as under File - Save) in binary format or verbose format.

### Help

The Help menu has the following option:

- ☐ **About** — Displays the FRU Viewer version information.

## SDR Manager Add-in

Clicking on the SDR Manager Add-in task brings up the Sensor Data Record (SDR) viewer. You can load and view the current SDR data stored in the BMC, save the currently loaded SDR data to a file or view previously saved SDR data. The SDR Viewer has the following menus:

### File

The File menu has the following options:

- ☐ **Load...** — View data from a previously saved SDR file.
- ☐ **Save...** — Saves the currently loaded SDR data to a file.
- ☐ **Save As...** — Saves the currently loaded SDR data to a file.
- ☐ **Exit** — Quits the SDR Viewer.

### View

The View menu has the following options:

- ☐ **SDR Info** — Displays information about the SDR. These fields are display only.
- ☐ **All Records** — Displays the current SDR data from the BMC.
- ☐ **By Record Type** — Brings up a pop-up menu that allows you to view only the data from a certain record type.

### Settings

The Settings menu has the following options:

- ☐ **Display HEX / Verbose** — Toggles between the Hex / interpreted mode of displaying the SDR records.
- ☐ **Output Text / Binary** — Determines whether SDR data will be saved to the file (as under File - Save) in binary format or verbose format.

### Help

The Help menu has the following option:

- ☐ **About** — Displays the SDR Viewer version information.

## Exiting the SSU

Exiting the SSU causes all windows to close.

- ☐ Exit the SSU by opening the menu bar item File in the SSU Main window.
- ☐ Click on Exit.
- or**
- ☐ Highlight Exit, and press Enter.

## Platform Event Paging

With Platform Event Paging (PEP), your server can be configured to automatically dial up a paging service and page you when a server error or management related event occurs. Platform events include out-of-range temperatures, out-of-range voltages, chassis intrusion, and fan failure.

If PEP is enabled and the BMC receives or detects a new event, it automatically sends a page. It can send a page if the processors are down or if the system software is unavailable.

PEP requires an external modem to be connected to the server's Emergency Management Port (EMP) serial connection. This is typically the COM2 serial connector.

Verify in the BIOS Setup of your server board whether or not your system BIOS includes PEP.

## Using Platform Event Paging

1. Enter Setup.
2. Enter the PEP Management submenu from the Server Menu.
3. Set the PEP Enable field to Enable.
4. Enter your page string in the PEP Page String field. This consists of the attention command for your modem (generally ATDT), the number of your paging service, several commas (each comma is a 1 second pause), the number/message you wish to appear on your pager, and the hangup command for your modem (generally ATH). You will need to experiment with the timing to ensure you are paged properly. Set the Send Test Page field to Send Test Page Now to generate a test page.
5. If you wish to filter events so that only certain events will originate a page, enter the PEP Filter submenu.
  - a. Set the PEF Enable field to Enable.
  - b. Enable all of the events about which you want to be paged.
  - c. Escape out of the PEP Filter submenu.
6. Set the time between pages with the Page Blackout Field. If you want to be paged every five minutes, set it to 5. The range is from 0 to 10 minutes.
7. Exit BIOS Setup.

## Emergency Management Port Console

The Emergency Management Port (EMP) Console is a software application designed to run on a Windows 95 or Windows NT 4.0 workstation and provides a server administrator's interface to the Emergency Management Port (EMP) of the L440GX+ server. This interface allows remote server management via a modem or direct connection.

The server control operations available with EMP Console are:

- ☐ Connecting to remote servers.
- ☐ Powering the server on or off.
- ☐ Resetting the server.

The EMP Console uses three management plug-ins to monitor the server:

- ☐ SEL Viewer
- ☐ SDR Viewer
- ☐ FRU Viewer

The EMP Console also has Phonebook plug-in that can be used to create and maintain a list of servers and their telephone numbers.

The EMP Console software utility is on the L440GX+ resource CD that ships with the product. It can be installed directly from the CD onto a workstation or from diskettes that can be created by booting to the ROM-DOS operating system, also on the CD, and selecting Create Diskettes.

## How EMP Console Works

The EMP shares use of the COM2 port with the system on the server. When the EMP has control of the port, the port operates in command mode. When the system has control, the port operates in console redirect mode. When connecting to a server, the EMP Console checks to determine the mode of the COM2 port. The following discussion covers how EMP Console functions in each mode.

### Command Mode

The default COM2 state. In this state, the EMP Console communicates with the server's firmware, allowing the client to remotely reset or power the server On or Off. The client can also view the server's System Event Log (SEL), Field Replaceable Unit (FRU) information or Sensor Data Record (SDR) table.

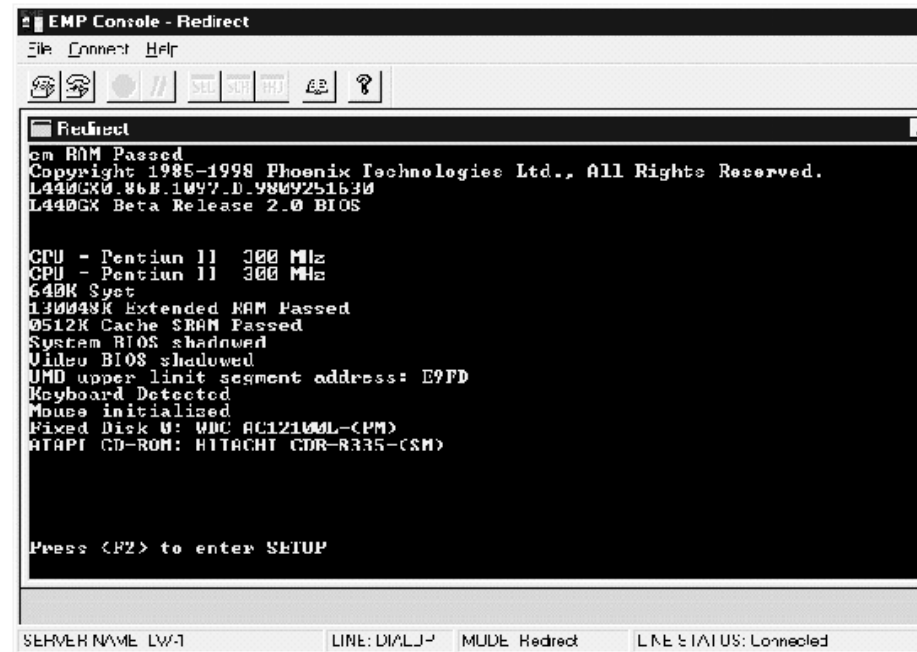
### Console Redirect Mode

The EMP Console serves as a PC ANSI terminal window for BIOS console redirection. Commands typed in this terminal window are transmitted through BIOS to the server's console, and text displayed on the server console is displayed on the EMP Console's terminal window. In this mode, you can remotely view boot messages, access BIOS setup and run DOS text mode applications through the EMP Console's terminal window.

## EMP Console in Command State



## EMP Console in Redirect State



## How EMP Console Works

(continued)

The EMP Console window is displayed (previous page) in the redirect mode with the terminal window. The text that appears on the server monitor displays in the Redirect window.

The availability of the various EMP Console features is determined by two factors: the BIOS EMP access mode and whether or not the server's COM2 port is configured for console redirection. The three EMP access modes are disabled, pre-boot and always active.

### EMP Console Access Modes (Server Configured for Console Redirection)

| <b>Mode</b>   | <b>Server is Powered Off</b>          | <b>During BIOS POST</b> | <b>After OS Boot</b> |
|---------------|---------------------------------------|-------------------------|----------------------|
| Disabled      | Redirect window appears, but is Blank | Redirect window         | Redirect window      |
| Pre-Boot      | EMP Commands available                | Redirect window*        | Redirect window      |
| Always Active | EMP Commands available                | Redirect window*        | Redirect window      |

\* The Operation Mode can be modified by selections in the Reset and Power on/off dialogs. These are server control dialogs available in the EMP Console.

### EMP Console Access Modes (Server not configured for console redirection)

| <b>Mode</b>   | <b>Server is Powered Off</b>          | <b>During BIOS POST</b>               | <b>After OS Boot</b>                  |
|---------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Disabled      | Redirect window appears, but is Blank | Redirect window appears, but is Blank | Redirect window appears, but is Blank |
| Pre-Boot      | EMP commands available                | EMP commands available                | Redirect window appears, but is Blank |
| Always Active | EMP commands available                | EMP commands available                | EMP commands available                |

## EMP Console Requirements

This section outlines the software requirements and hardware configurations necessary for using EMP Console.

### Operating Systems:

#### Windows 95 or Windows 98

- 16 MB RAM, 32 MB recommended
- 20 MB disk space

#### Windows NT

- Windows NT 4.0
- 24 MB RAM, 32 MB recommended
- 20 MB disk space

## EMP Console Requirements

(continued)

**Client Configuration:** EMP Console supports all COM ports on the client system, along with any Windows NT/95 compatible modem.

**Server Configuration:** EMP Console requires the server's COM2 port to be connected to an external modem or directly connected to a serial cable.

**Direct Connect Configuration:** A null modem serial cable is needed. Connect one end of the cable to the COM2 port of server and the other to a port on the client machine.

**Modem Configuration:** On the client, EMP Console uses the Windows Application Program Interface (API) to determine if a modem is connected and available. The EMP Console does not configure the modem; it should be preconfigured through Windows.

For modem support, the server must use a Hayes compatible modem that supports a baud rate of 19.2k. The modem must be on the Windows 95 or NT Hardware Compatibility List provided by Micron. The server modem must be set in auto-answer mode for EMP Console to be able to connect to it.

## Setting up the Server for the EMP

To use the EMP, you must configure the server's BIOS with specific settings. These settings are found in two submenus of the BIOS Server menu, the System Management Submenu and the Console Redirection Submenu. The BIOS settings section, found earlier in this document, shows all the available options. This section focuses on the settings that must be configured in order to use the EMP.

### System Management Submenu

All EMP related settings occur in the Server main menu. Change only the items highlighted below; all other default settings should remain the same.

**EMP Password Switch and EMP Password:** Anytime an attempt to initiate a connection is made, a prompt for the user password appears. If no EMP password is setup, then anyone can access the EMP by clicking OK. In the EMP Password area of the Server menu, the EMP Password Switch option must be set to enable. Then type in a password of up to eight alphanumeric characters. If a beep is heard, the password was accepted.

**EMP Access Modes:** Select Disabled, Pre-boot or Always Active, depending on the type of EMP access needed. The tables above show what is available with a given setting.

**EMP Restricted Mode Access:** Set Restricted Mode to either enabled or disabled as needed. If in enabled mode, this means that EMP Console's server control options, Power off and Reset, are unavailable, except power on. In disabled mode, these same server control options are available.

## System Management Submenu (continued)

**EMP Direct Connect/Modem Mode:** Select Direct Connect if a null modem serial cable directly connects the server's COM2 port to the EMP Console client machine. If they are connected via a modem, select Modem Mode.

## Console Redirection Submenu

The settings in the Console Redirection Submenu of the Server menu must be set exactly as highlighted below to be able to use the EMP.

**COM Port Address:** Select 2F8. This COM2 port must be used by the EMP. The IRQ# setting is automatically populated with the correct number based on the COM Port Address choice.

**Baud Rate:** Select 19.2k.

**Flow Control:** Choose CTS/RTS + CD.

## Main EMP Console Window

The main EMP Console window provides a graphical user interface (GUI) to access server control operations and to launch the management plug-ins. At the top of the window is the menu and tool bar. These provide the options to initiate plug-ins and other support features. A status bar at the bottom displays connection information such as server name, line status and mode.

## Toolbar

The tool bar buttons of the EMP Console main window combine server control and management plug-in commands available from both the Connect and Action menus as follows:



Displays the Connect dialog to allow connection to a selected server.



Disconnects from the currently connected server.



Displays the Power On/Off dialog.



Displays the Reset dialog.



Launches the SEL Viewer.



Launches the SDR Viewer.



Launches the FRU Viewer.



Displays the Phonebook dialog.



Displays the Online Help.

## Status Bar

The status bar is displayed at the bottom of the main window. It contains the following status information:

- ☐ **SERVER NAME:** The name of the connected server when connecting via modem.
- ☐ **LINE:** The type of line connection. This is either direct or modem.
- ☐ **MODE:** Either Redirect of EMP, depending on whether the EMP has control of the COM2 port.
- ☐ **LINE STATUS:** Gives status information about the server connection. For example, if a server is connected, the status bar says "Connected." Otherwise, the line is blank.

## EMP Console Main Menu

- ☐ **File**
  - **Exit** - exits EMP Console.
- ☐ **Connect**
  - **Disconnect** - disconnects the server connection.
  - **[Re]Connect** - displays the connect dialog.
  - A list of the five most recent modem connections. Click on one of these server names to initiate a connection.
- ☐ **Action**
  - **Power On/Off** - displays the Power on/off dialog.
  - **Reset** - displays the Reset dialog.
  - **SEL Viewer** - displays the SEL Viewer.
  - **SDR Viewer** - displays the SDR Viewer.
  - **FRU Viewer** - displays the FRU Viewer.
  - **Phonebook** - displays the Phonebook dialog.
- ☐ **Help**
  - **Help Topics** - help topics for EMP Console.
  - **Help About** - provides version information.

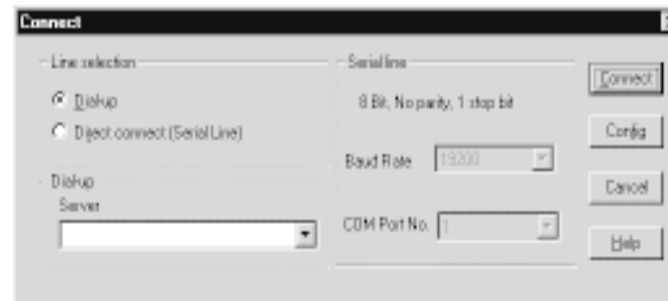
## Server Control Operations

Three server control operations are available from the menu or toolbar in EMP Console: remote server connection, powering the server on and off, and resetting the server. The server console mode can also be switched between EMP active and BIOS redirect modes through post-power-up and reset options.

## Connect

When [Re]Connect is selected from the Connect menu, the Connect dialog screen is displayed. This dialog allows you to connect to a server. If the client machine is already connected to a server, initiating connection generates a warning message. The message indicates that the existing connection will be terminated if you continue trying to initiate the new connection. You are prompted to enter the EMP password whenever a connection is attempted.

## Connect Dialog Screen



Options available in the dialog are:

- ❑ **Line Selection** - you can specify whether to use a direct connection or dial-up modem connection to the server.
  - **Dial-up** - connects to a selected server with a modem.
  - **Direct connect (Serial Line)** - connects to the selected server directly using a null modem serial cable.
- ❑ **Server** - a server name can be selected from the dropdown list of available servers. A server must be selected when the line selection is Dial-up.
- ❑ **Serial Line** - These options are enabled when the line selection is set to Direct connect (Serial Line).
  - **Baud Rate** - must be 19200 for EMP to connect properly.
  - **COM Port No.** - set the COM Port number to the port that the null modem serial cable is connected.

## Connect Dialog Screen

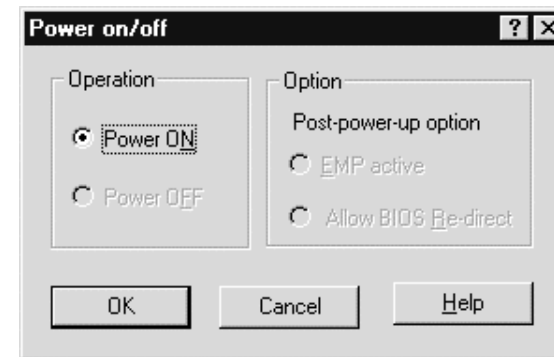
(continued)

- ☐ **Connect** - initiates the connection to the connected server. When this button is clicked, you are prompted for the EMP password.
- ☐ **Config** - displays the Phonebook dialog.
- ☐ **Cancel** - exits the Connect dialog without taking any action.
- ☐ **Help** - displays the help information for this dialog.

## Power On/Off

Selecting Power On/Off from the Action menu displays the Power on/off dialog screen. This dialog screen provides commands to remotely power on or power off the server.

## Power On/Off Dialog Screen



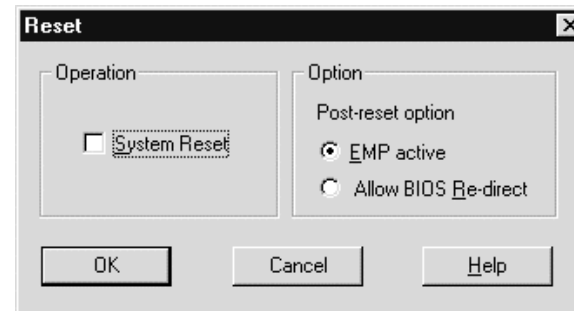
Options available in the dialog are:

- ☐ **Power ON** - powers on the server.
- ☐ **Power OFF** - powers off the server. This option is not allowed if the server is configured in RESTRICTED mode for EMP operations.
- ☐ **Post-power-up option** - sets the mode selection of the server to EMP active or BIOS redirection. The setting is available after the next power-up. The default selection is EMP active.
- ☐ **Cancel** - exits the Connect dialog without taking any action.
- ☐ **Help** - displays the help information for this dialog.

## Reset

Selecting Reset from the Action menu displays the Reset dialog screen. This dialog screen provides the ability to remotely reset the server with post-reset options.

### Reset Dialog Screen



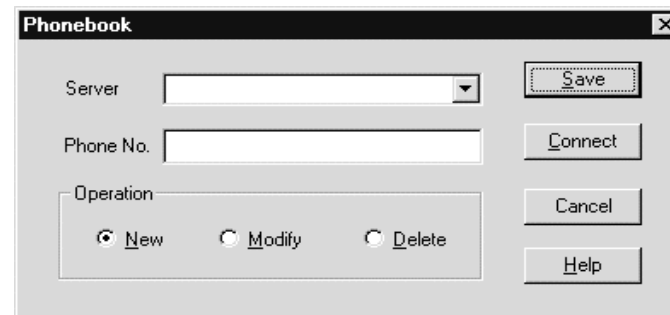
Options available in the Reset dialog are:

- ☐ **System Reset** - resets the server with the selected post-reset options. This operation is not allowed if the server is configured in RESTRICTED mode for EMP operations.
- ☐ **Post-reset option** - sets the post-reset option that will be in effect after reset. The options are EMP active or BIOS redirection. The default selection is EMP active.
- ☐ **Cancel** - exits the Connect dialog without taking any action.
- ☐ **Help** - displays the help information for this dialog.

## Phonebook

EMP Console provides a support plug-in known as the Phonebook. The Phonebook stores names and numbers of servers in a list that can be updated by adding, modifying or deleting entries. The Phonebook can be opened from the main menu and toolbar, or launched from the Connect dialog by clicking the Config button.

### Phonebook Dialog Screen



Options available in the Phonebook dialog screen are:

- ☐ **Server** - a dropdown list of server names stored in the Phonebook. If the New radio button is selected in the Operation area, this area is cleared.
- ☐ **Phone No.** - the number of the selected server. If the New radio button is selected in the Operation area, this area is cleared.
- ☐ **Operation**
  - **New** - lets you add a new entry in the Phonebook. Selecting this option clears the Server and Phone No. fields. You must click Save for the entry to be added to the Phonebook.
  - **Modify** - lets you edit an existing entry. You must select an existing entry from the Server dropdown list box and modify the existing telephone number before selecting this option. Click Save in order to update the entry in the phonebook.
  - **Delete** - lets you delete an entry from the Phonebook. You must first select an existing server from the Server dropdown list box before selecting this option. You must click Save for the entry to be deleted.
- ☐ **Save** - saves a new or modified Phonebook entry, or deletes an entry if the Delete radio button is selected.

## Phonebook Dialog Screen

(continued)

- ☐ **Connect** - displays the Connect dialog with the server from the Phonebook's Server dropdown list box already populating the Connect dialog's Server field.
- ☐ **Cancel** - exits the Connect dialog without taking any action.
- ☐ **Help** - displays the help information for this dialog.

## Management Plug-ins

### SEL Viewer

The SEL Viewer provides access to the System Event Log on the server and can display records in either hexadecimal or text (verbose) form. Options available through the SEL Viewer are:

- ☐ View the SEL from a saved file
- ☐ Save the SEL to a file
- ☐ View SEL summary info
- ☐ View all SEL entries
- ☐ View SEL entries by sensor type
- ☐ View SEL entries by event type
- ☐ Set SEL display mode to either Hex or verbose mode
- ☐ Set the SEL output file format to either text or binary format
- ☐ Close the SEL Viewer
- ☐ Exit the EMP Console

### SEL Viewer Menu Options

The following options are found on the SEL Viewer menu bar:

- ☐ **File**
  - **Open** - views SEL data from a previously saved file if it was stored in binary format. Selecting the Open menu item allows you to specify a filename under which the data is found. If the file cannot be opened, the program displays an error message.
  - **Close** - closes the SEL Viewer.
  - **Save** - saves the SEL events to a file in either binary raw or verbose text format. The binary file may be retrieved later. Once data has been saved to a file, selecting this option will save the data to the previously saved file. If no SEL events have been retrieved, then this menu option is not available.

## SEL Viewer Menu Options

(continued)

- **Save As** - saves the SEL events to a new file in either binary raw or verbose text format. The binary file may be retrieved later. Selecting this option lets you specify a filename to which the data will be saved. If no SEL events have been retrieved, then this menu option is not available.
- **Exit** - exits the EMP Console.
- ☐ **View**
  - **SEL Information** - displays SEL summary information as returned by the server.
  - **All Events** - displays all events in the SEL.
  - **By Sensor Type** - displays all events in the SEL generated by a specific sensor type such as voltage, temperature, etc. A submenu lets you select the sensor type to be displayed.
  - **By Event** - displays all the events in the SEL of a particular event type; for example, threshold, digital, or discrete. A pop-up menu lets you select the event type to be displayed.
  - **Settings** - changes several operating parameters for the SEL Viewer. This menu displays the following suboptions:
    - **Display HEX / Verbose** - toggles between HEX mode and interpreted mode of displaying SEL records.
    - **Output Text / Binary** - toggles between whether the SEL events will be saved to the file in binary format or verbose format.
- ☐ **Window** - gives options for displaying currently open windows.
- ☐ **Help**
  - **Help Topics** - help topics for EMP Console.
  - **Help About** - provides version information.

## SDR Viewer

The SDR Viewer lets you view the Sensor Data Records from the SDR repository. Options available through the SDR Viewer are:

- ☐ View all SDR records
- ☐ View SDR entries by SDR type
- ☐ View SDR summary info
- ☐ Set SDR display mode to either HEX or verbose mode
- ☐ Close the SDR Viewer
- ☐ Exit the EMP Console

## SDR Viewer Menu Options

The following options are found on the SDR Viewer menu bar:

- ☐ **File**
  - **Close** - closes the SDR Viewer.
  - **Exit** - exits the EMP Console.
- ☐ **View**
  - **Display all Records** - displays all records from the SDR repository.
  - **SDR Type** - displays the records of a particular SDR type. Select an SDR type from a pop-up menu that displays all the SDR types available for the given hardware.
  - **SDR Information** - displays the SDR summary information as returned by the server.
- ☐ **Settings** - changes the operating parameters for the SDR Viewer. This menu displays the following suboption:
  - **Display HEX / Verbose** - toggles between HEX mode and interpreted mode of displaying SDR records.
- ☐ **Window** - gives options for displaying currently open windows.
- ☐ **Help**
  - **Help Topics** - help topics for EMP Console.
  - **Help About** - provides version information.

## FRU Viewer

The FRU Viewer allows you to view the server's Field Replaceable Unit (FRU) data from the server's Front Panel FRU information area. The options available in the FRU Viewer are:

- ☐ View all FRU records
- ☐ View FRU summary info
- ☐ Set FRU display mode to either Hex or verbose mode
- ☐ Close the FRU Viewer
- ☐ Exit EMP Console

## FRU Viewer Menu Options

The following options are found on the FRU Viewer menu bar:

- ☐ **File**
  - **Close** - closes the FRU Viewer.
  - **Exit** - exits EMP Console.
- ☐ **View**
  - **Display all Records** - displays all FRU data, which consists of chassis, board and product information.
  - **FRU Information** - displays the FRU summary information as returned by the server.
- ☐ **Settings** - changes operating parameters for the FRU Viewer. This menu displays the following options:
  - **Display HEX / Verbose** - toggles between HEX mode and interpreted mode of displaying FRU records.
- ☐ **Window** - gives options for displaying currently open windows.
- ☐ **Help**
  - **Help Topics** - help topics for EMP Console.
  - **Help About** - provides version information.

## FRU / SDR Load Utility

The Field Replacement Unit (FRU) and Sensor Data Record (SDR) Load Utility is a DOS-based program used to update the server management subsystem's product level FRU, SDR and the Desktop Management Interface (DMI) nonvolatile storage components (EEPROMs). The FRU / SDR load utility:

- ☐ Discovers the product configuration based on instructions in a master configuration file.
- ☐ Displays the FRU information.
- ☐ Updates the nonvolatile storage device (EEPROM) associated with the Baseboard Management Controller (BMC) that holds the SDR and FRU area.
- ☐ Updates the DMI area located in the BIOS nonvolatile storage device.
- ☐ Generically handles FRU devices that may not be associated with the BMC.

## When to Run the FRU / SDR Load Utility

You should run the FRU / SDR Load Utility each time you upgrade or replace the hardware in your server, excluding add-in boards, hard drives and RAM. For example, if you replace an array of fans, you need to run the utility. The FRU / SDR Load Utility programs the sensors that need to be monitored for server management.

Because the firmware must reload to properly initialize the sensors after programming, turn the server off and remove the AC power cords from the server. Wait approximately 30 seconds, and reconnect the power cords.

## What You Need to Do

The FRU / SDR Load Utility may be run directly from the Micron Configuration Software CD or from a diskette you create from the CD. It can be extracted from the CD by booting to the CD and selecting "Make Diskettes" or by inserting the CD into a PC running Windows 95 or NT and selecting the "Utilities" section.

### Note



*If the Floppy Disk drive is disabled, or improperly configured, you must use BIOS Setup to enable it. If necessary, you can disable the Floppy Drive after you are done with the FRU / SDR utility.*

How You Use the FRU / SDR Load Utility

This utility is compatible with ROM-DOS Ver. 6.22, MS-DOS<sup>+</sup> Ver. 6.22 and later versions. The utility accepts CFG, SDR and FRU load files. The executable file for the utility is frusdr.exe. The utility requires the following supporting files:

- ❑ One or more **.fru** files describing the system's field replaceable units.
- ❑ A **.cfg** file describing the system configuration.
- ❑ A **.sdr** file describing the sensors in the system.

Command Line Format

The basic command line format is

```
frusdr [/?] [/h] [/d {dmi, fru, sdr}] [/cfg filename.cfg] /p
```

| Command            | Description                   |
|--------------------|-------------------------------|
| frusdr             | Is the name of the utility.   |
| /? or/h            | Displays usage information.   |
| /d (dmi, fru, sdr) | Only displays requested area. |
| /cfg filename.cfg  | Uses custom CFG file.         |
| /p                 | Pause between blocks of data. |

Parsing the Command Line

The FRU / SDR Load Utility allows only one command line function at a time. A command line function may consist of two parameters, for example, cfg filename.cfg. Any invalid parameters result in displaying an error message and exiting the program. You can use either a slash (/) or a minus sign (-) to specify command line options. The /p flag may be used in conjunction with any of the other options.

Displaying Usage Information

When the utility is run with the /? or /h command line flags, the following message is displayed:

```
FRU & SDR Load Utility Version 3.0
Usage: frusdr                Is the name of the utility.
      /? or/h                Displays usage information.
      /d (dmi, fru, sdr)     Only displays requested area.
      /cfg filename.cfg      Uses custom CFG file.
      /p                     Pause between blocks of data.
```

## Displaying a Given Area

When the utility is run with the /d DMI, /d FRU, or /d SDR command line flag, the indicated area is displayed. Each area represents a sensor; one sensor for each instrumented device in the server. If the given display function fails because of an inability to parse the data present or a hardware failure, the utility displays an error message and exits.

## Displaying DMI Area

The DMI area is displayed in ASCII format when the field is ASCII or as a number when the field is a number. Each DMI area displayed is headed with the DMI area designated name. Each field has a field name header followed by the field in ASCII or as a number.

## Displaying FRU Area

The FRU area is displayed in ASCII format when the field is ASCII or as a number when the field is a number. Each FRU area displayed is headed with the FRU area designated name. Each field has a field name header followed by the field in ASCII or as a number. The Board, Chassis and Product FRU areas end with an END OF FIELDS CODE that indicates there is no more data in this area. The Internal Use area is displayed in hex format, 16 bytes per line.

## Displaying SDR Area

The SDR nonvolatile storage area is displayed in the following hex format. The data is separated by a Sensor Record Number X header, where X is the number of that sensor record in the SDR area. The next line after the header is the sensor record data in hex format delineated by spaces. Each line holds up to 16 bytes. The data on each line is followed by the same data in ASCII format; nonprintable characters are substituted by a period (.).

## Using Specified CFG File

The utility can be run with the command line parameter of -cfg filename.cfg. The filename can be any DOS accepted, eight-character filename string. The utility loads the specified CFG file and uses the entries in the configuration file to probe the hardware and to select the proper SDRs to load into nonvolatile storage.

## Displaying Utility Title and Version

The utility displays its title:

```
FRU & SDR Load Utility, Version 3.0
```

Where X.XX is the revision number for the utility.

## Configuration File

The configuration file is in ASCII text. The utility executes commands formed by the strings present in the configuration file. These commands cause the utility to perform various tasks needed to ultimately load the proper SDRs into the nonvolatile storage of the BMC and possibly generic FRU devices. Some of the commands may be interactive and require you to make a choice.

**Prompting for Product Level FRU Information**

By using a Configuration File, the utility may prompt you for FRU information.

**Filtering Sensor Data Record From the SDR File**

The MASTER.SDR file has all the possible SDRs for the system. These records may need to be filtered based on the current product configuration. The configuration file directs the filtering of the SDRs.

**Updating the SDR Nonvolatile Storage Area**

After the utility validates the header area of the supplied SDR file, it updates the SDR repository area. Before programming, the utility clears the SDR repository area. The SDR file is loaded via the .cfg file. Then the utility filters all tagged SDRs depending on the product configuration set in the Configuration File. A nontagged SDR is automatically programmed. The utility also copies all written SDRs to the SDR.TMP file. It contains an image of what was loaded, and the TMP file is useful for debugging the server.

**Updating FRU Nonvolatile Storage Area**

After the configuration is determined, the utility updates the FRU nonvolatile storage area. It then verifies the Common Header area and checksum from the specified FRU file. The Internal Use Area is read out of the specified .FRU file and is programmed into the nonvolatile storage. The Chassis, Board, Product, and MultiRecord areas are read out of the specified .FRU file, if they exist, then those areas are programmed into the FRU nonvolatile storage. All the areas are also written to the FRU.TMP file, which is useful for debugging the server.

**Updating DMI FRU Nonvolatile Storage Area**

After programming the BMC FRU area, the utility then programs the following Chassis, Board, and Product FRU information to the DMI fields, but only when dictated by the Configuration File.

If a failure occurs, the utility displays an error message and exits.

**Cleaning Up and Exiting**

If an update was successfully performed, the utility displays an appropriate message and then exits with a DOS exit code of zero.

If the utility fails, it immediately exits with an error message and a non-zero DOS exit code.

## Upgrading the BIOS

### Preparing for the Upgrade

Before you upgrade the BIOS, prepare for it by recording the current BIOS settings, obtaining the upgrade utility from Micron and making a copy of the current BIOS.

### Recording the Current BIOS Settings

1. Boot the computer and press <F2> when you see the message:

Press <F2> Key if you want to run SETUP

2. Record all the settings displayed in the BIOS Setup program.

Note



*Do not skip Step 2. You will need these settings to configure your computer at the end of the procedure.*

### Obtaining the Upgrade Utility

You can upgrade to a new version of the BIOS using the new BIOS files and the BIOS upgrade utility, iFLASH.EXE. You can obtain the BIOS upgrade file and the iFLASH.EXE utility from the Micron Technical Support website.

Note



*Please review the instructions distributed with the upgrade utility before attempting the BIOS upgrade.*

This upgrade utility allows you to:

- ☐ Upgrade the BIOS in flash memory.
- ☐ Update the language section of the BIOS.

The following steps explain how to upgrade the BIOS.

### Creating a Bootable Floppy Diskette

1. Use a DOS or Windows 95 system to create the floppy disk.
2. Insert a blank floppy disk in floppy drive A.
3. At the C:\ prompt, for an unformatted floppy disk, type:  
`format a: /s`  
or, for a formatted floppy disk, type:  
`sys a:`
4. Press [Enter]

## Creating the BIOS Upgrade Floppy Diskette

The BIOS upgrade file is a compressed self-extracting archive that contains the files you need to upgrade the BIOS.

1. Copy the BIOS upgrade file to a temporary directory on your hard disk.
2. From the C:\ prompt, change to the temporary directory.
3. To extract the file, type the name of the BIOS upgrade file, for example:  
`10006BI1.EXE`
4. Press <Enter>. The extracted file contains the following files:  
`LICENSE.TXT`  
`README.TXT`  
`BIOS.EXE`
5. Read the LICENSE.TXT file, this contains the software license agreement and the README.TXT file, which contains the instructions for the BIOS upgrade.
6. Insert the bootable floppy disk into drive A.
7. To extract the BIOS.EXE file to the floppy disk, change to the temporary directory that holds the BIOS.EXE file and type:  
`BIOS A:`
8. Press <Enter>.
9. The floppy disk now holds the BIOS upgrade and recovery files.

## Performing the BIOS Upgrade

1. Boot the computer with the floppy disk in drive A. The BIOS upgrade utility screen appears.
2. `Select Update Flash Memory From a File.`
3. `Select Update System BIOS. Press <Enter>.`
4. Use the arrow keys to select the correct .bio file. Press <Enter>.
5. When the utility asks for confirmation that you want to flash the new BIOS into memory, select `Continue with Programming.` Press <Enter>.
6. When the utility displays the message `upgrade is complete`, remove the floppy disk. Press <Enter>.
7. As the computer boots, check the BIOS identifier (version number) to make sure the upgrade was successful.

## Performing the BIOS Upgrade

(continued)

8. To enter the Setup program, press <F2> when you see the message:  
Press <F2> Key if you want to run SETUP
9. For proper operation, load the Setup program defaults. To load the defaults, press <F9>.
10. To accept the defaults, press <Enter>.
11. Set the options in the Setup program to the settings you wrote down before the BIOS upgrade.
12. To save the settings, press <F10>.
13. To accept the settings, press <Enter>.
14. Turn the computer off and reboot.

## Recovering the BIOS

It is unlikely that anything will interrupt the BIOS upgrade, however, if an interruption occurs, the BIOS could be damaged. The following steps explain how to recover the BIOS if an upgrade fails. For the following procedure, use the Recovery Mode from the Setup program.

### Note



*Because of the small amount of code available in the nonerasable boot block area, there is no video support. You will not see anything on the screen during the procedure. Monitor the procedure by listening for signals from the chassis speaker and looking at the floppy drive activity LED.*

1. Turn all peripheral devices connected to the computer off. Make sure the computer is off.
2. Remove the computer cover.
3. Locate Jumper block J3J2.
4. Move the Recovery Boot jumper from pins 9-10 to pins 10-11.
5. Insert the bootable BIOS upgrade floppy disk into floppy drive A.
6. Replace the cover, turn the computer on, and allow it to boot. The recovery process will take a few minutes.
7. Listen for the chassis speaker to beep.
8. Two beeps and the end of activity in drive A indicate successful BIOS recovery.
9. A series of continuous beeps indicates failed BIOS recovery.

**Recovering the BIOS** (continued)

10. If recovery fails, return to Step 1 and repeat the recovery process.
11. If recovery is successful, turn the computer off. Remove the computer cover and continue with the following steps.
12. Move the Recovery Boot jumper back to pins 9-10.
13. Replace the computer cover. Leave the upgrade disk in drive A and turn the computer on.
14. Continue with the BIOS upgrade.

**Changing the BIOS Language**

You can use the BIOS upgrade utility to change the language the BIOS uses for messages and the Setup program. Use a bootable floppy disk containing the current flash utility and language files.

1. Boot the computer with the bootable floppy disk in drive A. The BIOS upgrade utility screen appears.
2. `Select Update Flash Memory From a File.`
3. `Select Update Language Set. Press [Enter].`
4. Select drive A and use the arrow keys to select the correct .lng file. Press [Enter].
5. When the utility asks for confirmation that you want to flash the new language into memory, select `Continue with Programming.` Press [Enter].
6. When the utility displays the message `upgrade is complete,` remove the floppy disk. Press [Enter].
7. The computer will reboot and the changes will take effect.

**Using the Firmware Update Utility**

The Firmware Update Utility is a DOS-based program used to update the Baseboard Management Controller's (BMCs) firmware code. You need to run the Firmware Update Utility only if new firmware code becomes necessary.

**Running the Firmware Update Utility**

1. Create a DOS bootable diskette. The version of DOS must be 6.0 or higher.
2. Place the firmware update utility (FWUPDATE.EXE) and the \*.hex file on the diskette. Make a note of the \*.hex file name, you will need it later.
3. Insert the diskette into drive A and boot to it.
4. At the DOS prompt, run the executable file (FWUPDATE.EXE).
5. The utility will display a menu screen. Select "Upload Flash."

## Running the Firmware Update Utility (continued)

6. The utility will ask for a file name. Enter the name of the \*.hex file.
7. The program will load the file and then ask if it should "Upload Boot Block." Press "N" to continue.
8. The program will next ask if it should "Upload Operational Code." Press "Y" to continue.
9. Once the operational code has been updated and verified, press any key to continue. Then press the ESC key to exit the program.
10. Shut the system down and remove any floppy disks that may be in the system.
11. Disconnect the AC power cord from the system and wait 60 seconds.
12. Connect the AC power cord and power up the system.

## Installing Video Drivers

After configuring the system, you need to install video drivers to take full advantage of the features of the onboard Cirrus Logic CL-GD5480 super VGA video controller.

- ☐ The Micron Computer Resource CD includes video drivers for use with DOS and Windows NT. Check the README.TXT file on the CD for information on installing these drivers.
- ☐ For other operating systems, see your OS instructions for installing device drivers.

## Using the Adaptec SCSI Utility

The Adaptec SCSI utility detects the SCSI host adapters on the server board. The utility runs out of BIOS and is used to

- ☐ Change default values
- ☐ Check and/or change SCSI device settings that may conflict with those of other devices in the server

## Running the SCSI Utility

1. When this message is displayed on the monitor:  
Press Ctrl-A to run SCSI Utility...
2. Press <Ctrl+A> to run this utility. When the SCSI Utility screen appears, choose the *host adapter* that you want to configure.

Another Adaptec utility that is available on the Micron Computer Resource CD is the Adaptec EZ SCSI utility. It is designed to be installed from the CD directly to a DOS or Windows operating system.

# Chapter 5

## Problem Solving

### Resetting the System

This chapter helps you identify and solve problems that might occur while you are setting up the system.

#### To do This:

Soft boot reset, which clears system ememory and reloads the operating system.

Clear system memory, restart POST and reload the operating system.

Cold boot reset. Turn the system power off and then on. This clears system ememory, restarts POST, reloads the operating system, and halts power to all peripherals.

#### Press:

<Ctrl+Alt+Del>

Reset button

Power Off/On

### Fault Resilient Booting

Fault resilient booting insures the system will not stop from a boot problem. Two sets of timers are implemented in the BMC that will automatically reset the system if the system should halt for some reason.

- ☐ **FRB 2 - 5 second timer.** If the primary processor does not come up in five seconds the system will automatically reset and switch to the secondary processor (if installed). If a second processor is not installed, the system will try to restart the primary processor again.
- ☐ **FRB 3 - 7 minute timer.** If the system does not make it up to the end of POST in 7 minutes, the system will automatically reset and try again. It is assumed that the processor failed regardless of what may have caused the system to hang. The primary processor is taken off line and the system will boot from the secondary (if installed otherwise it will try to restart the primary again). Bad memory or a bad plug in card may cause a FRB 3 failure.

All failures are recorded to the system event log.

The system will remember all FRB errors and display them at the end of POST until you select the Processor Retest option from the BIOS Setup utility.

## Initial System Startup

### Checklist

Problems that occur at initial system startup are usually caused by incorrect installation or configuration. Hardware failure is a less frequent cause.

- ☐ Are all cables correctly connected and secured?
- ☐ Are the processors or processor termination board fully seated in their slots on the server board?
- ☐ Are all add-in ISA and PCI boards fully seated in their slots on the server board?
- ☐ Are all switch and jumper settings on the server board correct?
- ☐ Are all jumper and switch settings on add-in boards and peripheral devices correct? To check these settings, refer to the manufacturer's documentation that comes with them. If applicable, ensure that there are no conflicts—for example, two add-in boards sharing the same interrupt.
- ☐ Are all SDRAM DIMMs installed correctly?
- ☐ Are all peripheral devices installed correctly?
- ☐ If the system has a hard disk drive, is it properly formatted or configured?
- ☐ Are all device drivers properly installed?
- ☐ Are the configuration settings made with the SSU correct?
- ☐ Is the operating system properly loaded? Refer to the operating system documentation.
- ☐ Did you press the system power on/off switch on the front panel to turn the server on (power on light should be lit)?
- ☐ Is the system power cord properly connected to the system and plugged into a NEMA 5-15R outlet for 100-120 V~ or a NEMA 6-15R outlet for 200-240 V~?
- ☐ Is AC power available at the wall outlet?
- ☐ Are all integrated components from the tested components lists? Check the tested memory and chassis lists, as well as the supported hardware and operating system list on the Micron Technical Support website.

## Running New Application Software

### Checklist

Problems that occur after you install any new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly.

- ☐ Does the system meet the minimum hardware requirements for the software? See the software documentation.
- ☐ Is the software an authorized copy? If not, get one; unauthorized copies often do not work.
- ☐ If you are running the software from a diskette, is it a good copy?
- ☐ If you are running the software from a CD-ROM disc, is the disc scratched or dirty?
- ☐ If you are running the software from a hard disk drive, is the software correctly installed? Were all necessary procedures followed and files installed?
- ☐ Are the correct device drivers installed?
- ☐ Is the software correctly configured for the system?
- ☐ Are you using the software correctly?

If the problems persist, contact the software vendor's customer service representative.

## After the System Has Been Running Correctly

### Checklist

Problems that occur after the system hardware and software have been running correctly often indicate equipment failure. Many situations that are easy to correct, however, can also cause such problems.

- ☐ If you are running the software from a diskette, try a new diskette copy of the software.
- ☐ If you are running the software from a CD-ROM disc, try a different disc to see if the problem occurs on all discs.
- ☐ If you are running the software from a hard disk drive, try running it from a diskette. If the software runs correctly, there may be a problem with the copy on the hard disk drive. Reinstall the software on the hard disk, and try running it again. Make sure all necessary files are installed.
- ☐ If the problems are intermittent, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.

## After the System Has Been Running Correctly (continued)

### Note



- ☐ If you suspect that a voltage spike, power outage or brownout might have occurred, reload the software and try running it again. (Symptoms of voltage spikes include a flickering video display, unexpected system reboots and the system not responding to user commands.)

**Random errors in data files:** *If you are getting random errors in your data files, they may be being corrupted by voltage spikes on your AC power line. If you are experiencing any of the above symptoms that might indicate voltage spikes on the power line, you may want to install a surge suppressor between the power outlet and the system power cord.*

## Preparing the System for Diagnostic Testing

### Caution



This section provides a more detailed approach to identifying a problem and locating its source.

**Turn all devices off before disconnecting cables:** *Before disconnecting any peripheral cables from the system, turn the system off and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.*

## Procedure

1. Turn the system and all external peripheral devices off. Disconnect all of them from the system, except the keyboard and video monitor.
2. Make sure the system power cord is plugged into a properly grounded AC outlet.
3. Make sure your video display monitor and keyboard are correctly connected to the system. Turn the video monitor on. Set the brightness and contrast controls to at least two thirds of their maximum ranges (see the documentation supplied with the video display monitor).
4. If the operating system normally loads from the hard disk drive, make sure there is no diskette in drive A. Otherwise, place a diskette containing the operating system files in drive A.
5. Turn the system on. If the power LED does not illuminate, see "Power LED Does Not Illuminate."

## Verifying Proper Operation of Key Systems

As POST determines the system configuration, it tests for the presence of each mass storage device installed in the system. As each device is checked, its activity LED should briefly turn on. Check for the following:

- ☐ Does the Floppy Disk drive activity LED briefly illuminate? If not, see “Diskette Drive Activity LED Does Not Illuminate”.
- ☐ If a second diskette drive is installed, does its activity LED briefly illuminate? If not, see “Diskette Drive Activity LED Does Not Illuminate”.
- ☐ If there is a Hard Disk drive or SCSI devices installed in the system, does the Hard Disk drive activity LED on the control panel briefly illuminate? If not, see “Hard Disk Drive Activity LED Does Not Illuminate”.

## Confirming Loading of the Operating System

Once the system boots up, the operating system prompt appears on the screen. The prompt varies according to the operating system. If the operating system prompt does not appear, see “Initial System Startup”.

## Specific Problems and Corrective Actions

This section provides possible solutions for these specific problems:

- ☐ Power LED does not illuminate.
- ☐ There is no beep or an incorrect beep pattern.
- ☐ No characters appear on the monitor.
- ☐ Characters on the monitor appear distorted or incorrect.
- ☐ System cooling fans do not rotate.
- ☐ Floppy Disk drive activity LED does not illuminate.
- ☐ Hard Disk drive activity LED does not illuminate.
- ☐ CD-ROM drive activity LED does not illuminate.
- ☐ There are problems with the application software.
- ☐ The bootable CD-ROM is not detected.

Try the solutions in the order given. If you cannot correct the problem, contact the vendor's service representative or the authorized Micron dealer for help.

## Power LED Does Not Illuminate

Check the following:

- ☐ Is the system operating normally? If so, the power LED is probably defective or the cable from the front panel to the server board is loose.
- ☐ Are there other problems with the system? If so, check the items listed under “System Cooling Fans Do Not Rotate Properly.”

### No Characters Appear on Screen

Check the following:

- ☐ Is the keyboard functioning? Check to see that the “Num Lock” LED is illuminated.
- ☐ Is the video monitor plugged in and turned on?
- ☐ Are the brightness and contrast controls on the video monitor properly adjusted?
- ☐ Are the video monitor switch settings correct?
- ☐ Is the video monitor signal cable properly installed?
- ☐ Is the onboard video controller enabled?

If you are using an add-in video controller board, perform the following:

1. Verify that the video controller board is fully seated in the server board connector.
2. Reboot the system for changes to take effect.
3. If there are still no characters on the screen after you reboot the system and POST emits a beep code, write down the beep code you hear. This information is useful for your service representative. See “Port-80 Codes and Countdown Codes.”
4. If you do not receive a beep code and characters do not appear, the video display monitor or video controller may have failed. Contact your service representative or authorized dealer for help.

### Characters Are Distorted or Incorrect

Check the following:

- ☐ Are the brightness and contrast controls properly adjusted on the video monitor? See the manufacturer’s documentation.
- ☐ Are the video monitor signal and power cables properly installed?

If the problem persists, the video monitor may be faulty or it may be the incorrect type. Contact your Micron technical support representative for help.

### System Cooling Fans Do Not Rotate Properly

If the system cooling fans are not operating properly, system components could be damaged. Check the following:

- ☐ Is AC power available at the wall outlet?
- ☐ Is the system power cord properly connected to the system and the wall outlet?
- ☐ Did you press the power button?
- ☐ Is the power on LED illuminated?
- ☐ Have any of the fan motors stopped (use the server management subsystem to check the fan status)?
- ☐ Are the fan power connectors properly connected to the server board?
- ☐ Is the cable from the front panel board connected to the server board?
- ☐ Are the power supply cables properly connected to the server board?
- ☐ Are there any shorted wires caused by pinched cables or power connector plugs forced into power connector sockets the wrong way?

If the switches and connections are correct and AC power is available at the wall outlet, contact your Micron technical support representative for help.

### Floppy Disk Drive Activity LED Does Not Illuminate

Check the following:

- ☐ Are the Floppy Disk drive power and signal cables properly installed?
- ☐ Are all relevant switches and jumpers on the Floppy Disk drive set correctly?
- ☐ Is the Floppy Disk drive properly configured?
- ☐ Is the Floppy Disk drive activity LED always on? If so, the signal cable may be plugged in incorrectly.

If you are using the onboard diskette controller, use the SSU to make sure that "Onboard Floppy" is set to "Enabled." If you are using an add-in diskette controller, make sure that "Onboard Floppy" is set to "Disabled." Refer to run the SSU.

If the problem persists, there may be a problem with the Floppy Disk drive, server board or drive signal cable. Contact your Micron technical support representative for help.

### Hard Disk Drive Activity LED Does Not Illuminate

If you have installed one or more hard disk drives in your system, check the following:

- ☐ Are the power and signal cables to the drive properly installed?
- ☐ Are all relevant switches and jumpers on the hard drive and adapter board set correctly?
- ☐ Is the onboard IDE controller enabled? (IDE hard drives only)
- ☐ Is the hard disk drive properly configured?

If the problem persists, there may be a problem with the Hard Disk drive, server board or drive signal cable. Contact your Micronpc.com technical support representative for help.

Note



*Front panel hard disk LED indicates IDE and SCSI devices: The hard disk drive activity LED on the front panel illuminates when either an IDE hard disk drive or a SCSI device, controlled by the onboard SCSI host controller, is in use. This LED does not display CD-ROM activity.*

### CD-ROM Drive Activity LED Does Not Illuminate

Check the following:

- ☐ Are the power and signal cables to the CD-ROM drive properly installed?
- ☐ Are all relevant switches and jumpers on the drive set correctly?
- ☐ Is the drive properly configured?
- ☐ Is the onboard IDE controller enabled?

If the problem persists, there may be a problem with the CD-ROM Disk drive, server board or drive signal cable. Contact your Micron technical support representative for help.

Note



*Front panel hard disk LED indicates IDE and SCSI devices: The hard disk drive activity LED on the front panel illuminates when either an IDE hard disk drive or a SCSI device, controlled by the onboard SCSI host controller, is in use. This LED does not display CD-ROM activity.*

**Cannot Connect to a Server**

- ☐ Make sure you are using the drivers that are shipped on the system Micron Configuration Software CD for the onboard network controller.
- ☐ Make sure the driver is loaded and the protocols are bound.
- ☐ Make sure the network cable is securely attached to the connector at the system back panel and that the network controller Link LED is on (visible at back panel). If the cable is attached but the problem persists, try a different cable.
- ☐ Make sure the hub port is configured for the same duplex mode as the network controller.
- ☐ Check with your LAN administrator about the correct networking software that needs to be installed.
- ☐ If you are directly connecting two servers (no hub), you will need a crossover cable (see your hub documentation for more information on crossover cables).
- ☐ Check the network controller LEDs that are visible through an opening at the system back panel.

**Problems with the Network**

The server hangs when the drivers are loaded.

- ☐ Change the PCI BIOS interrupt settings. Try the “PCI Installation Tips” below.

Diagnostics pass, but the connection fails.

- ☐ Make sure the network cable is securely attached.
- ☐ Make sure you specify the correct frame type in your NET.CFG file.

The Link LED does not illuminate.

- ☐ Make sure you have loaded the network drivers.
- ☐ Check all cable connections.
- ☐ Try another port on the hub.
- ☐ Make sure you have the correct type of cable between the adapter and the hub. Some hubs require a crossover cable while others require a straight through cable (for more information on crossover cabling, see your hub documentation).

**Problems with the Network**

(continued)

The Activity LED does not illuminate.

- ☐ Make sure you've loaded the correct network drivers.
- ☐ Network may be idle. Try accessing a server.

The controller stopped working when an add-in adapter was installed.

- ☐ Make sure the cable is connected to the port from the onboard network controller.
- ☐ Make sure the PCI BIOS is current. Try the "PCI Installation Tips" below.
- ☐ Make sure the other adapter supports shared interrupts. Also, make sure the operating system supports shared interrupts; OS/2<sup>†</sup> does not.
- ☐ Try reseating the add-in adapter card.

The add-in adapter stopped working without apparent cause.

- ☐ Try reseating the adapter first; then try a different slot if necessary.
- ☐ The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.
- ☐ Run the diagnostics.

**PCI Installation Tips**

Some common PCI tips are listed here.

- ☐ Reserve interrupts (IRQs) and/or memory addresses specifically for ISA adapters. This prevents PCI cards from trying to use the same settings ISA cards are using. Use the SSU to keep track of ISA adapter resources.
- ☐ Certain drivers may require interrupts that are not shared with other PCI drivers. The SSU can be used to adjust the interrupt numbers for PCI devices. For certain drivers, it may be necessary to alter settings so that interrupts are not shared.

**Problems with Application Software**

If you have problems with application software, do the following:

- ☐ Verify that the software is properly configured for the system. See the software installation and operation documentation for instructions on setting up and using the software.
- ☐ Try a different copy of the software to see if the problem is with the copy you are using.
- ☐ Make sure all cables are installed correctly.
- ☐ Verify that the server board jumpers are set correctly.

**Problems with Application Software** (continued)

- ☐ If other software runs correctly on the system, contact your vendor about the failing software.

If the problem persists, the software may be incompatible. Contact the software vendor's customer service representative for help.

**Bootable CD-ROM Is Not Detected**

Check the following:

- ☐ Is the BIOS set to allow the CD-ROM to be the first bootable device?

**Error and Informational Messages**

When you turn the system on, POST displays messages that provide information about the system. If a failure occurs, POST emits beep codes that indicate errors in hardware, software or firmware. If POST can display a message on the video display screen, it causes the speaker to beep twice as the message appears.

**Port-80 Codes and Countdown Codes**

After the video adapter has been successfully initialized, the BIOS indicates the current testing phase during POST after the video adapter has been successfully initialized by outputting a 2-digit hex code to I/O location 80h. If a port-80h ISA POST card is installed, it displays the 2-digit code on a pair of hex display LEDs.

**POST Error Codes and Messages**

The error codes and messages are representative of various conditions BIOS identifies. The exact strings and error numbers may be different for each BIOS version.



# Chapter 6

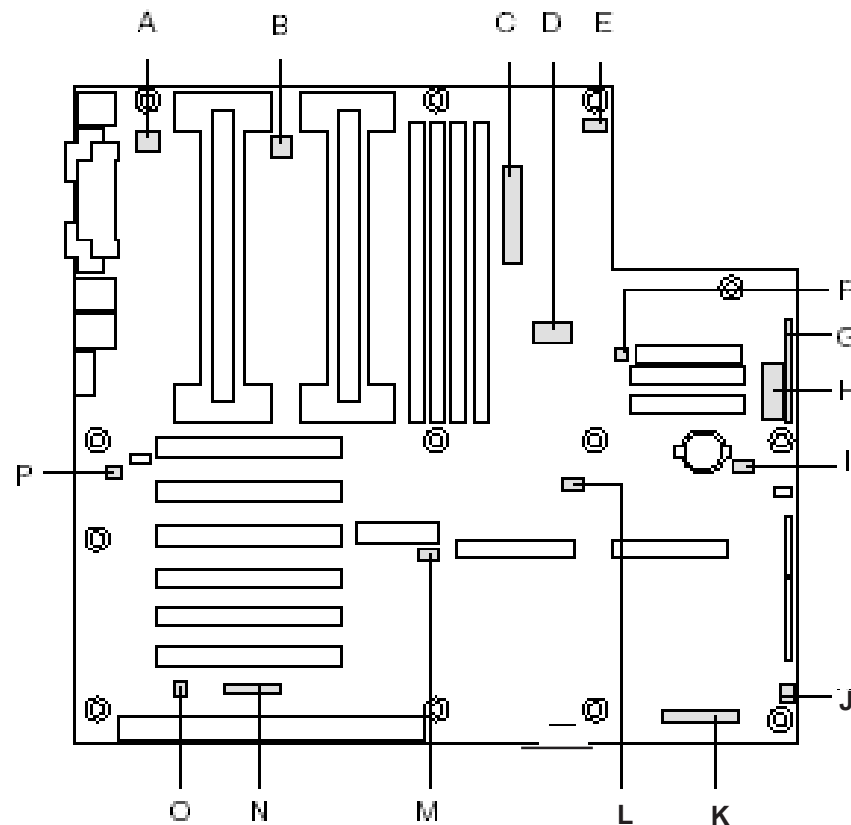
## Technical Reference

### Connector Locations

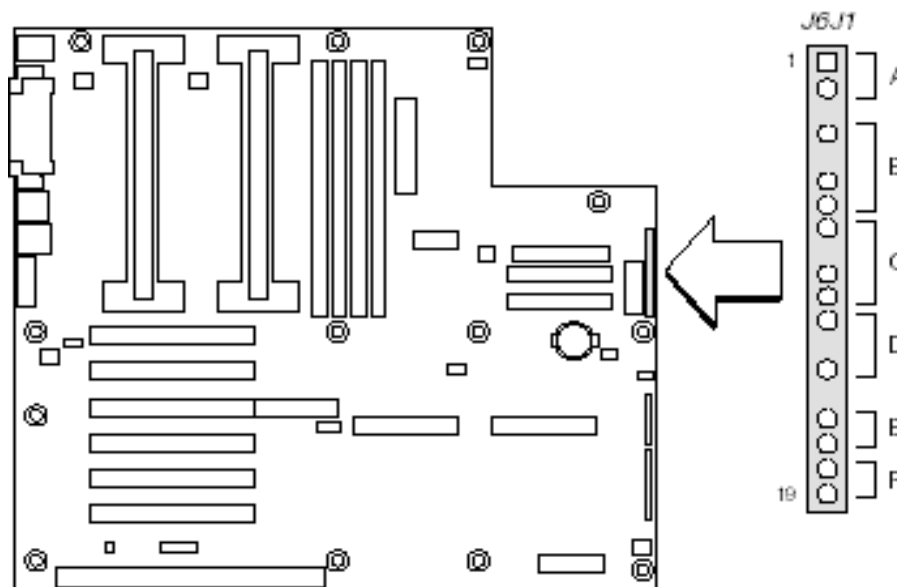
This chapter helps you identify Board interrupts, Jumper settings and pin information about the connectors..

The figure shows connector locations on the server board.

- A. Fansink connector 2
- B. Fansink connector 1
- C. Main Power connector
- D. ATX Aux Power connector
- E. SM IMB
- F. Fan Connector 2A
- G. ATX Front Panel connector
- H. Front Panel connector, 16 pin
- I. ISOL IMB
- J. Fan connector 1
- K. Server Monitor Module (SMM)
- L. External Wake on LAN connector
- M. Hard Drive LED connector
- N. ICMB Header
- O. Chassis Intrusion connector
- P. Fan connector 2B



## ATX Style Front Panel Connector



## ATX Style Front Panel Connector Pinout

| Connector                  | Pin | Signal              | Connector       | Pin | Signal              |
|----------------------------|-----|---------------------|-----------------|-----|---------------------|
| A. Power Switch            | 1   | Power Switch        | D. Power LED    | 12  | Current limited +5V |
|                            | 2   | GND                 |                 | 13  | N/C                 |
|                            | 3   | N/C                 |                 | 14  | GND                 |
| B. Hard Drive Activity LED | 4   | Current limited +5V |                 | 15  | N/C                 |
|                            | 5   | Key                 | E. Reset Switch | 16  | GND                 |
|                            | 6   | HD Activity LED     |                 | 17  | Reset Switch        |
|                            | 7   | Current limited +5V | F. Sleep Switch | 18  | GND                 |
| C. Speaker                 | 8   | GND                 |                 | 19  | Sleep Switch        |
|                            | 9   | N/C                 |                 |     |                     |
|                            | 10  | PIEZO_IN            |                 |     |                     |
|                            | 11  | SPKR_HDR            |                 |     |                     |

**Main Power Connector Pinout**

| <u>PIN</u> | <u>Signal</u> | <u>Pin</u> | <u>Signal</u> |
|------------|---------------|------------|---------------|
| 1          | +3.3V         | 13         | +3.3V         |
| 2          | +3.3V         | 14         | -12V          |
| 3          | COM           | 15         | COM           |
| 4          | +5V           | 16         | PS_ON         |
| 5          | COM           | 17         | COM           |
| 6          | +5V           | 18         | COM           |
| 7          | COM           | 19         | COM           |
| 8          | PWR_OK        | 20         | -5V           |
| 9          | +5VSB         | 21         | +5V           |
| 10         | +12V          | 22         | +5V           |
| 11         | +12V          | 23         | +5V           |
| 12         | +3.3V         | 24         | COM           |

**Fan Interface**

The server board has five 3-pin fan connectors that are shrouded and keyed. Two are located next to the processor sockets (one for each processor); each is intended to be used for a tachometer fan heat sink.

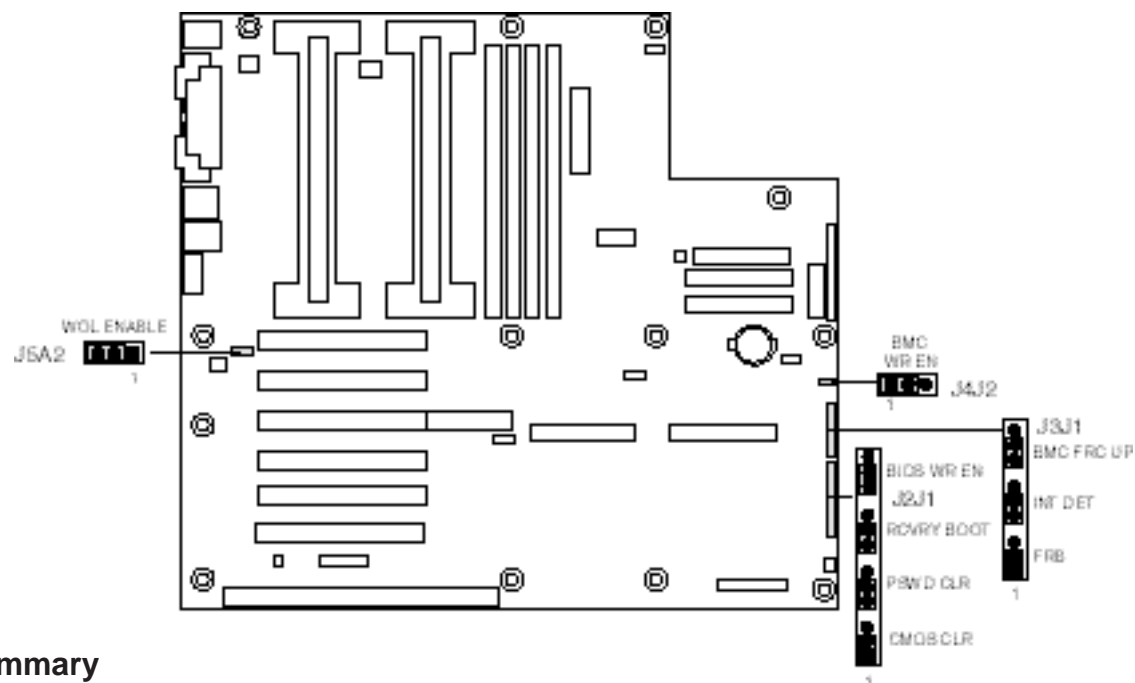
**Caution**

*Fan connectors 2A and 2B cannot be used simultaneously. If you plug fans into both connectors, the fans will not operate properly.*

**Fan Connector Pinout**

| <u>PIN</u> | <u>Signal</u> |
|------------|---------------|
| 1          | GND           |
| 2          | +12V          |
| 3          | Fan Sensor    |

## Server Board Jumper Locations



## Server Board Jumper Summary

| <u>Jumper Block</u> | <u>Jumper Name</u> | <u>Pins (default in bold)</u> | <u>What it does at system reset</u>   |
|---------------------|--------------------|-------------------------------|---|
| <b>J5A2</b>         | WOL ENABLE         | 1-2, Disabled                 | Disables Wake On LAN. If your power supply does not provide 0.8 A of +5V Standby current, you must move the WOL Enable jumper to this position. |
|                     |                    | <b>2-3, Enabled</b>           | Enables Wake On LAN.  |
| <b>J4J2</b>         | BMC WR EN          | <b>1-2, Protect</b>           | BMC boot block is write protected.  |
|                     |                    | 2-3, Erase/Program            | BMC boot block is erasable and programmable.  |
| <b>J3J1</b>         | FRB                | <b>1-2, Enabled</b>           | FRB operation is enabled (system boots from processor 1 if processor 0 does not respond).   |
|                     |                    | 2-3, Disabled                 | FRB is disabled.  |

## Server Board Jumper Summary (continued)

| <b>Jumper Block</b> | <b>Jumper Name</b> | <b>Pins (default in bold)</b> | <b>What it does at system reset</b>  |
|---------------------|--------------------|-------------------------------|--|
| <b>J3J1</b>         | INT DET            | <b>5-6, Enabled</b>           | Switch installed on chassis indicates when cover has been removed.   |
|                     |                    | 6-7, Disabled                 | Chassis intrusion switch is bypassed.  |
| <b>J3J1</b>         | BMC FRC UP         | <b>9-10, Normal</b>           | System boots normally.   |
|                     |                    | 10-11, Program                | System attempts to update BMC Firmware.  |
| <b>J2J1</b>         | CMOS CLR           | <b>1-2, Protect</b>           | Preserves the contents of NVRAM.   |
|                     |                    | 2-3, Erase                    | Replaces the contents of NVRAM with the manufacturing default settings.  |
| <b>J2J1</b>         | PSWD CLR           | <b>5-6, Protect</b>           | Maintains the current system password.   |
|                     |                    | 6-7, Erase                    | Clears the password.   |
| <b>J2J1</b>         | RCVRY BOOT         | <b>9-10, Normal</b>           | System attempts to boot using the BIOS stored in Flash Memory.   |
|                     |                    | 10-11, Recovery               | BIOS Attempts a recovery boot, loading BIOS code from a floppy diskette into the flash device. This is typically used when the BIOS code has been corrupted. |
| <b>J2J1</b>         | BIOS WR EN         | <b>13-14, Protect</b>         | BIOS boot block is write-protected.  |
|                     |                    | 14-15, Erase/Program          | BIOS boot block is erasable and programmable.  |

## General Procedure to Change Jumper Settings

The general procedure for changing any configuration setting is the same for most of the jumper functions, so we will describe it here.

1. Observe the safety and ESD precautions outlined at the beginning of this section.
2. Turn all connected peripherals off, turn system power off and disconnect the AC power cord.
3. Remove the side cover. You do not need to remove the server board from the chassis, and you probably do not need to remove any add-in boards.

## General Procedure to Change Jumper Settings (continued)

4. The configuration jumpers are located at the edge of the server board toward the front of the system.
5. Move the jumper to pins specified for the desired setting.
6. Reinstall the side cover, connect the power cord and turn power to the system on for the change to take effect.
7. You may need to repeat these steps to move the jumper back to its original setting, depending on the jumper function.

## CMOS Jumper

The jumper at pins 1, 2 and 3 controls whether settings stored in CMOS nonvolatile memory (NVRAM) are retained during a system reset.

Procedure to restore the system's CMOS and RTC to default values:

1. Refer to the "General Procedure to Change Jumper Settings."
2. Move the CMOS jumper from pins 1-2 to pins 2-3 (the Clear CMOS memory position).
3. Reinstall the side cover for your safety, and connect the power cord to the system.
4. Turn the system on. Wait for POST to complete and for the messages "NVRAM cleared by jumper" and "Press F2 to enter Setup" to appear. This automatically reprograms CMOS and RTC to their default settings.
5. Enter Setup and make any changes necessary (for example, changing the boot device). Press F10 to save the new Setup configuration and exit Setup.
6. Turn the system off, and disconnect the power cord from the system.
7. Again, remove the side cover.
8. Move the jumper from pins 2-3 back to pins 1-2 (the Protect CMOS memory position).
9. Reinstall the side cover, and connect the power cord to the system.
10. Run BIOS Setup or the SSU to verify the correct settings.

## Password Jumper

The jumper at pins 5, 6 and 7 controls whether the user and administrative passwords are retained or cleared during a system reset.

Procedure to clear the current password and then enter a new one:

1. Refer to the “General Procedure to Change Jumper Settings.”
2. Move the Password jumper from pins 5-6 to pins 6-7.
3. Reinstall the side cover for your safety, and connect the power cord to the system.
4. Turn the system on, and wait for POST to complete. This automatically clears the password.
5. Turn the system off, and disconnect the power cord.
6. Again, remove the side cover.
7. Move the jumper from pins 6-7 back to pins 5-6.
8. Reinstall the side cover, and connect the power cord to the system.
9. Run the SSU to specify a new password.

## Recovery Boot Jumper

The jumper at pins 9, 10 and 11 controls whether the system attempts to boot using the BIOS programmed in the boot block area of the FLASH memory. This should be used only if the operational area of the BIOS is corrupted or needs to be upgraded. Contact your Micron service representative before doing this.

Procedure to disable recovery booting:

1. Refer to the “General Procedure to Change Jumper Setting.”
2. Move the recovery boot jumper from pins 9-10 to pins 10-11.
3. Reinstall the side cover for your safety, and connect the power cord to the system.
4. Turn the system on, and insert the Flash Memory Update Utility diskette in drive A. After the system boots, the speaker emits a single beep and the recovery process starts. This takes about three minutes. When the recovery process completes, the speaker emits two beeps.

While in the recovery mode, there is no screen display on the monitor. The keyboard is disabled as the system automatically recovers the BIOS. The following beep codes describe the recovery status.

## Recovery Boot Jumper

(continued)

| Beep Code                      | Message   |
|--------------------------------|---|
| 2                              | Successful completion, No Errors.   |
| 4                              | The system could not boot from the diskette. The diskette may not be bootable.                        |
| Continuous series of low beeps | The wrong BIOS recovery files are being used and/or the flash memory jumper is in the wrong position. |

5. Turn the system off, disconnect the power cord(s) from the system and remove the left side cover.
6. Move the jumper from pins 9-10 to pins 10-11 to enable the normal boot mode.
7. Replace the left side cover, remove the diskette from drive A and connect the power cord(s) to the system.
8. After running the special recovery mode, run the SSU to specify a new password.

## Boot Block Write Protect Jumper

Caution



The jumper at pins 13, 14 and 15 controls whether the BIOS boot block is protected from being erased and reprogrammed.

**Leave the boot block jumper at the factory default setting:** *Programming the boot block incorrectly will prevent the system from booting. Programming should be done only by a Micron qualified technician. The procedure requires a special "Boot Block Update Utility." Contact your Micron dealer or sales representative for more information.*

Procedure to permit boot block erasing and programming:

1. Refer to the "General Procedure to Change Jumper Setting."
2. Move the boot block jumper from pins 13-14 to pins 14-15 to erase and program the BIOS boot block.
3. Reinstall the side cover for your safety, and connect the power cord to the system.
4. Run the Boot Block Update Utility.
5. Turn the system off, and disconnect the power cord from the system.
6. Remove the side cover.

### Boot Block Write Protect Jumper (continued)

7. Move the jumper from pins 14-15 back to pins 13-14 to write protect the BIOS boot block.
8. Reinstall the side cover, and connect the power cord to the system.

### FRB Timer Enable Jumper

The jumper at pins 5, 6 and 7 controls the FRB timers.

Procedure to disable FRB timer:

1. Refer to the “General Procedure to Change Jumper Setting.”
2. Move the recovery boot jumper from pins 5-6 to pins 6-7.
3. Reinstall the side cover for your safety, and connect the power cord to the system.
4. Turn the system on, and wait for POST to complete.
5. Run the SSU to configure the system.

### Chassis Intrusion Detection Jumper

The chassis contains an alarm switch that sends a notification signal to the server management software when a cover is removed. The jumper at pins 9, 10 and 11 controls whether this alarm feature is enabled or disabled.

Procedure to disable (bypass) the chassis intrusion switch:

1. Refer to the “General Procedure to Change Jumper Setting” on page 100.
2. Move the chassis intrusion detection jumper from pins 9-10 to pins 10-11 to disable the alarm switch.
3. Reinstall the side cover for your safety, and connect the power cord to the system.
4. Turn the system on, and wait for POST to complete.
5. Run the SSU to configure the system.

To enable the intrusion alarm switch, do the above steps but return the jumper back to pins 9-10.

## Server Board Installation Instructions

### Caution



*Follow these guidelines to meet safety and regulatory requirements when installing the server board assembly.*

Read and adhere to all of these instructions and the instructions supplied with the host computer and associated modules. If the instructions for the host computer are inconsistent with these instructions or the instructions for associated modules, contact the supplier's technical support to find out how you can ensure that your computer meets safety and regulatory requirements. If you do not follow these instructions and the instructions provided by host computer and module suppliers, you increase safety risk and the possibility of noncompliance with regional laws and regulations.

## Ensure Electromagnetic Compatibility

Before computer integration, make sure that the host chassis, power supply and other modules have passed Electromagnetic Compatibility (EMC) certification testing.

In the installation instructions for the host chassis, power supply, and other modules pay close attention to the following:

- ☐ Certifications (Refer to "Ensure Host Computer and Accessory Module Certifications".)
- ☐ External I/O cable shielding and filtering.
- ☐ Mounting, grounding, and bonding requirements.
- ☐ Keying connectors when mismating of connectors could be hazardous.

If the host chassis, power supply and other modules have not passed applicable EMC certification testing before integration, EMC testing must be conducted on a representative sample of the newly completed computer.

## Ensure Host Computer and Accessory Module Certifications

### In Europe

Make sure that the host computer, any added subassembly (such as a board or drive assembly, including internal or external wiring), is certified for the region(s) where the end product will be used. Marks on the product are proof of certification. Certification marks are as follows:

The CE marking signifies compliance with all relevant European requirements. If the host computer does not bear the CE marking, obtain a supplier's Declaration of Conformity to the appropriate standards required by the European EMC Directive and Low Voltage Directive. Other directives, such as the Machinery and Telecommunications Directives may also apply depending on the type of product. No regulatory assessment is necessary for low voltage DC wiring used internally or wiring used externally when provided with appropriate overcurrent protection. Appropriate protection is provided by a maximum 8 Amp current limiting circuit or a maximum 5 Amp fuse or positive temperature coefficient (PTC) resistor. This Intel server board has PTCs on all external ports that provide DC power externally.

### In the United States

A certification mark by a Nationally Recognized Testing Laboratory (NRTL) such as UL, CSA, or ETL signifies compliance with safety requirements. External wiring must be UL Listed and suitable for the intended use. Internal wiring must be UL Listed or Recognized and rated for applicable voltages and temperatures. The FCC mark (Class A for commercial or industrial only or Class B for residential) signifies compliance with electromagnetic interference requirements.

### In Canada

A nationally recognized certification mark such as CSA or cUL signifies compliance with safety requirements. No regulatory assessment is necessary for low voltage DC wiring used internally or wiring used externally when provided with appropriate overcurrent protection. Appropriate protection is provided by a maximum 8 Amp current limiting circuit or a maximum approved 5 Amp fuse or positive temperature coefficient (PTC) resistor. This server board has PTCs on all external ports that provide DC power externally.

## Prevent Power Supply Overload

Do not overload the power supply output. To avoid overloading the power supply, make sure that the calculated total current load of all the modules within the computer is less than the maximum output current rating of the power supply. If you do not do this, the power supply may overheat, catch fire, or damage the insulation that separates hazardous AC line circuitry from low voltage user accessible circuitry and result in a shock hazard. If the load drawn by a module cannot be determined by the markings and instructions supplied with the module, contact the module supplier's technical support.

## Place Battery Marking on Computer

Warning



There is insufficient space on this server board to provide instructions for replacing and disposing of the battery. The following warning must be placed permanently and legibly on the host computer as near as possible to the battery.

**Danger of explosion if battery is incorrectly replaced.**

**Replace the battery with only the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.**

## Use Only for Intended Applications

This product was evaluated for use in ITE computers that will be installed in offices, schools, computer rooms and similar locations. The suitability of this product for other product categories other than ITE applications, (such as medical, industrial, alarm systems, and test equipment) may require further evaluation.

## Installation Precautions

When you install and test the server board, observe all warnings and cautions in the installation instructions.

To avoid injury, be careful around the:

- ☐ Sharp pins on connectors.
- ☐ Sharp pins on printed circuit assemblies.
- ☐ Rough edges and sharp corners on the chassis.
- ☐ Hot components (like processors, voltage regulators and heat sinks).
- ☐ Damage to wires that could cause a short circuit.

Observe all warnings and cautions that instruct you to refer computer servicing to Micron qualified technicians.

Warning



**Do NOT open the power supply. Risk of electric shock and burns from high voltage and rapid overheating. There are NO User Servicable parts in the power supply. Refer servicing of the power supply to Micron qualified technical personnel.**

## Current Usage

As an overall current usage limitation on the power supply, do not exceed a combined power output of 167 watts for the +5 and +3.3 volt outputs.

The ISA slots on the server board are rated at a maximum of 4.5 amperes per slot. The ISA specification recommends supporting an average of 2.0 amperes per slot. The average current usage should not exceed 3.0 amperes per slot; that is, 15 watts.

The PCI slots on the server board are rated at a maximum of 5 amperes per slot. The maximum power allowed for each slot is 20 watts at +5 volts. The average current usage per slot should not exceed 3.0 amperes per slot; that is, 15 watts.

The cooling efficiency varies per slot; therefore, ensure that adequate cooling is available in the target slot—especially in an expansion slot drawing more than 2.0 amperes.

## Calculating Power Consumption

The total combined wattage for the system configuration must be less than the output of your power supply. Use the two worksheets in this section to calculate the power used by your server boards. For current and voltage requirements of add-in boards and peripherals, see your vendor documents.

## Calculating DC Power Usage-Worksheet

1. List the current for each board and device in the appropriate voltage level column.
2. Add the currents in each column. Then go to the next worksheet.

### Current (Maximum) at Voltage Level

| Device                                     | +3.3V | +5V  | -5V  | +12V | -12V |
|--|-------|------|------|------|------|
| Server board                               | 1.0A  | 8.0A | 0.1A | 1.1A | 0.4A |
| Primary Processor                          |       |      |      |      |      |
| Secondary Processor                        |       |      |      |      |      |
| Terminator card,<br>if no second processor | 1.6A  |      |      |      |      |
| Memory (four 128 MB DIMMs)                 | 1.8A  | 0.3A |      |      |      |
| PCI Slot 1                                 |       |      |      |      |      |
| PCI Slot 2                                 |       |      |      |      |      |
| PCI Slot 3                                 |       |      |      |      |      |
| PCI Slot 4                                 |       |      |      |      |      |
| PCI Slot 5                                 |       |      |      |      |      |
| PCI Slot 6                                 |       |      |      |      |      |
| ISA Slot 1                                 |       |      |      |      |      |
| 1 <sup>st</sup> 3.5-inch Hard Disk Drive   |       |      |      |      |      |
| 2 <sup>nd</sup> 3.5-inch Hard Disk Drive   |       |      |      |      |      |
| 3 <sup>rd</sup> 3.5-inch Hard Disk Drive   |       |      |      |      |      |
| 4 <sup>th</sup> 3.5-inch Hard Disk Drive   |       |      |      |      |      |
| 5 <sup>th</sup> 3.5-inch Hard Disk Drive   |       |      |      |      |      |
| 6 <sup>th</sup> 3.5-inch Hard Disk Drive   |       |      |      |      |      |
| 7 <sup>th</sup> 3.5-inch Hard Disk Drive   |       |      |      |      |      |
| 3.5-inch Floppy Disk Drive                 |       |      |      |      |      |

**Current (Maximum) at Volage Level** (continued)

|                      |  |  |  |  |  |
|----------------------|--|--|--|--|--|
| CD-ROM Drive         |  |  |  |  |  |
| Cooling Fan 1        |  |  |  |  |  |
| Cooling Fan 2        |  |  |  |  |  |
| Cooling Fan 3        |  |  |  |  |  |
|                      |  |  |  |  |  |
|                      |  |  |  |  |  |
|                      |  |  |  |  |  |
| <b>Total Current</b> |  |  |  |  |  |

**Total Combined Power Used by the System - Worksheet**

1. From the previous worksheet, enter the total current for each column.
2. Multiply the voltage by the total current to get the total wattage for each voltage level.
3. Add the total wattage for each voltage level to arrive at a total combined power usage on the power supply.

**Voltage Level and Total Current****(V x A = W)**

(+3.3 V) x (\_\_\_\_\_ A)

(+5 V) x (\_\_\_\_\_ A)

(-5 V) x (\_\_\_\_\_ A)

(+12 V) x (\_\_\_\_\_ A)

(-12 V) x (\_\_\_\_\_ A)

**Total Combined Wattage****Total Watts for each Voltage Level**

\_\_\_\_\_ W

\_\_\_\_\_ W

\_\_\_\_\_ W

\_\_\_\_\_ W

\_\_\_\_\_ W

\_\_\_\_\_ W

**Equipment Log**

Use the blank equipment log provided here to record information about your system.  
You will need some of this information when you run the SSU.

| Item                                | Manufacturer Name and Model Number | Serial Number | Date Installed |
|-------------------------------------|------------------------------------|---------------|----------------|
| System                              |                                    |               |                |
| Server Board                        |                                    |               |                |
| Primary Processor speed and cache   |                                    |               |                |
| Secondary Processor speed and cache |                                    |               |                |
| Video Display                       |                                    |               |                |
| Keybaord                            |                                    |               |                |
| Mouse                               |                                    |               |                |
| Diskette Drive A                    |                                    |               |                |
| Diskette Drive B                    |                                    |               |                |
| Tape Back-up Drive                  |                                    |               |                |
| CD-ROM Drive                        |                                    |               |                |
| Hard Disk Drive 1                   |                                    |               |                |
| Hard Disk Drive 2                   |                                    |               |                |
| Hard Disk Drive 3                   |                                    |               |                |
| Hard Disk Drive 4                   |                                    |               |                |
| Hard Disk Drive 5                   |                                    |               |                |
| Hard Disk Drive 6                   |                                    |               |                |
| Hard Disk Drive 7                   |                                    |               |                |
| Hard Disk Drive 8                   |                                    |               |                |
| Hard Disk Drive 9                   |                                    |               |                |
| Hard Disk Drive 10                  |                                    |               |                |





# Appendix A Regulatory Information

## Environmental Specifications

|  |   |
|--|---|
| <b>Temperature</b><br><b>Non-operating</b><br><b>Operating</b>       | 0° to 50° C (32° to 122° F); Altitude to 40,000 ft. max.<br>5° to 35° C (41° to 98° F); Derated 0.5° C for every 1000 ft (305 m)                                    |
| <b>Humidity</b><br><b>Non-operating</b><br><b>Operating wet bulb</b> | 5% to 95% relative humidity (non-condensing) at 30° C (86° F)<br>10% to 90% relative humidity; Not to exceed 33° C (91.4° F) with diskette drive or hard disk drive |
| <b>Shock</b><br><b>Operating</b><br><b>Packaged</b>                  | 2.0G, 11ms, 1/2 sine<br>50.0G, 11ms, 1/2 sine   |
| <b>Vibration</b><br><b>Operating</b><br><b>Packaged</b>              | 2.0g, 20 to 500 Hz<br>3.1g, 5 to 500 Hz   |
| <b>AC Input Power</b><br><b>100-120 V~</b><br><b>200-240 V~</b>      | 100-120 V~, 9.5 A, 50/60 Hz<br>200-240 V~, 5.5 A, 50/60 Hz  |

## Regulatory Specifications

### Declaration of the Manufacturer or Importer

We hereby certify that this product is in compliance with European Union EMC Directive 89/336/EEC, using standards EN55022 (Class B) and EN50082-1 and Low Voltage Directive 73/23/EEC, Standard EN60950.

### Safety Compliance

**USA:** UL 1950 - CSA 950-95, 3<sup>rd</sup> Edition

### Electromagnetic Compatibility (EMC)

**USA:** FCC CFR 47 Part 15, Class B

**International:** CISPR 22, Class B

### Electromagnetic Compatibility Notice (USA)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on; the user is encouraged to try to correct the interference by one or more of the following measures:

- ☐ Reorient or relocate the receiving antenna.
- ☐ Increase the separation between the equipment and the receiver.
- ☐ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ☐ Consult the dealer or an experienced radio / TV technician for help.

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment. The customer is responsible for ensuring compliance of the modified product.

Only peripherals (computer input/output devices, terminals, printers, etc.) that comply with FCC Class B limits may be attached to this computer product. Operation with non-compliant peripherals is likely to result in interference to radio and TV reception.

All cables used to connect to peripherals must be shielded and grounded. Operation with cables, connected to peripherals that are not shielded and grounded may result in interference to radio and TV reception.

**Note**

**Class A device definition:** *If a Class A device is installed within this system, the system is to be considered a Class A system. In this configuration, operation of this equipment in a residential area is likely to cause harmful Frequency Modulated interference.*

**Product Type: NF3400/3401  
FCC Declaration of Conformity**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions related to the EMC performance of this product, contact:

Micronpc.com

900 E. Karcher Road

Nampa, Idaho 83687

1-888-349-6972

**Notice**

The Telephone Consumer Protection Act of 1991, makes it unlawful for any person to use a computer or their electronic device to send any message via a telephone facsimile machine unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission the following information:

1. The date and time of transmission.
2. Identification of the business, business entity or individual sending the message;
3. Telephone number of the sending machine, business entity or individual.
4. In order to program this information into your fax/modem, please refer to the appropriate instructions in your fax/modem manual.

**European Union CE Marking  
Declaration**

This product has been tested and found to comply with the EMC requirements subject to the EU directive for CE marking.

# Appendix B Safety Guidelines

## General Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User's Manual for later reference.
3. Disconnect this equipment from AC outlet before cleaning. Don't use liquid or sprayed detergent directly on the equipment. Use a damp cloth for cleaning.
4. For plugable equipment, the AC power outlet should be installed near the equipment and easily accessible.
5. Keep this equipment away from high humidity.
6. Always lay this equipment on a steady surface. A drop or fall could damage your new system.
7. The openings on the enclosure are for air convection and protects the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Ensure the power source is the correct voltage before connecting your system.
9. Do not place anything over the power cord or where it can be stepped on.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect the equipment to avoid damage by power surges.
12. Keep all liquids away from the unit. Spills could cause fire or electrical shock.
13. Never open the equipment. For safety and warranty reasons, equipment should only be opened by Micron qualified service personnel.
14. In one of the following situations, get the equipment checked by a qualified service technician, if:
  - ☐ The power cord or plug is damaged.
  - ☐ Liquid has penetrated into the equipment.
  - ☐ The equipment has been exposed to moisture.

**Caution**

*To reduce the risk of an electric shock, which could cause personal injury, follow all safety notices. The symbols shown are used in your documentation and on your equipment to indicate safety hazards.*

**Warning**

**Lithium batteries can be dangerous. Improper handling or installation of lithium batteries may result in an explosion. Replace them only with an exact replacement. Dispose of lithium batteries by returning them to your dealer, or ask your local disposal service for proper procedures.**

**Warning**

**Under no circumstances should the user attempt to disassemble the power supply. The power supply has no user-replaceable parts. Inside the power supply are hazardous voltages that can cause serious personal injury. A defective power supply must be returned to your dealer.**

To prevent electrical shock, connect all local (individual office) computers and computer support equipment to the same electrical circuit of the building wiring. If you are unsure, check the building wiring to avoid remote earth conditions.

**Earth Bonding**

**Earth Bonding** For safe operation, only connect the equipment to a building power supply that is in accordance with current wiring regulations in your country. In the U.K., those regulations are the IEE.

# Appendix C Glossary

**ACPI:** Advanced Configuration Power Interface. A standard that regulates all Plug-and-Play devices.

**ACPI Function:** This options enables / disables ACPI functionality.

**AGP:** Accelerated Graphics Port. A high-performance bus for graphics-intensive applications which operates independently of the PCI bus.

**API:** Advanced Program Interface. A language and message format used by an application program to communicate with another program that provides services for it. APIs, are usually implemented by writing function calls. Examples of APIs are the calls made by an application program to such programs as an Operating System, messaging system or database management system (DBMS).

**Application:** A complete, self-contained program that performs a specific function directly for the user.

**AUI Connector:** Attachment Unit Interface. A transceiver cable used in networks or telecommunications. The 15-pin shielded twisted-pair ethernet cable provides a path between a node's ethernet interface and the media access unit (MAU). Also called thicknet connector.

**Bandwidth:** The difference between the highest and lowest frequencies of transmission channel. A measure of the information capacity of the transmission channel. Bandwidth is expressed in bits per second (bps).

**BIOS:** Basic Input / Output System. Programs that are permanently stored in the system board's EEPROM chips providing functions such as the power-on self test (POST). Also see, EEPROM.

**BMC:** Baseboard Management Controller.

**Boot:** To start the computer system and load the operating system.

**Bridge:** A device that interconnects local or remote networks across all higher level protocols. Bridges form a single logical network, centralizing network administration. Bridges operate at the physical and link layers of the Open Systems Interconnect (OSI) reference model.

**Bus:** The set of address or data lines used to transfer information between different components within a computer (such as memory, the microprocessor, and the expansion slots). The width of the bus or the number of parallel connectors, determines the size in bits of the largest data item that it can carry.

**Cache:** Small, fast, local storage for frequently accessed instructions and data to provide the processor with the fastest stream of information possible, while keeping main memory current. Can also used for a local copy of data accessible over a network, and more.

**Cache DRAM or Cached DRAM:** Combines an SRAM cache with 4 or 16 MB of DRAM within a single IC chip. Depending on whether the application needs serial or random access, this

onboard SRAM can be used as both a cache or buffer. Because the RAM does not have to send its information to an external SRAM cache, overall system performance is considerably improved .

**Cache RAM:** Cache is a small block of high-speed memory (usually SRAM) located between the CPU and main memory that is used to store frequently requested data and instructions. When the processor needs data, it will check in high-speed cache first to see if the data is there. If not, then the processor will retrieve the data from slower main memory.

**CD-ROM:** Compact Disc-Read Only Memory. An information (data) storage device that uses compact disc technology. CDs can store over 650MB, until recently they could not be written to, hence the appellation Read Only.

**CISC:** Complex Instruction Set Chip. A processor where each instruction can perform several low-level operations such as memory access, arithmetic operations or address calculations. Also see, RISC.

**Client / Server:** A common form of distributed system in which software is split between server tasks and user / client tasks. A client sends requests to a server asking for information or action, and the server responds. There may be either one centralized server or several distributed ones.

**Clock:** A circuit that sends a consistent, periodic signal used to synchronize the computer and to step information through the system.

**Closed:** A complete circuit. Usually accomplished by placing a jumper over two pins on the system board or a peripheral card. Also see "Open" and "Jumper."

**Cluster Server:** A group of independent servers managed as a

single system thus allowing higher hardware availability, easier manageability and greater network scalability.

**CMOS:** Complementary Metal Oxide Semiconductor. A logic circuit family that uses very little power. It stores system setup information including system hardware settings. Sometimes used to store information by applying constant, uninterrupted power through the use of an external battery.

**Collapsed Backbone:** Network architecture under which the backplane of a device such as a hub performs the function of a network backbone; the backplane routes traffic between desktop nodes and between other hubs serving multiple LANs.

**Compact Disc:** A 4.72 inch disc that can store still and / or moving images in monochrome and / or color; stereo or two separate sound tracks integrated with and / or separate from the images; and digital programs and information files.

**Controller:** This part of a computer, typically a separate circuit board, allows the computer to use certain kinds of peripheral devices. Disk controllers connect hard disks and floppy disks. The most common disk controllers in use are IDE and SCSI controllers. Most home personal computers use IDE controllers. High-end PCs, workstations and network file servers mostly have SCSI controllers.

**Coprocessor:** A microprocessor device that performs specialized computations which assists the main processor by performing certain special functions, usually much faster than the main processor could perform them in software. The coprocessor often decodes instructions in parallel with the main processor and executes only those instructions intended for it.

**CPU:** Central Processing Unit. The integrated circuit chip that performs the actual computing functions of the computer. Other chips perform support functions like storing data and controlling peripherals. Also see microprocessor.

**DIMM:** Dual In-line Memory Module. Small circuit boards carrying memory integrated circuits, with signal and power pins on both sides of the board, in contrast to single-in-line memory modules (SIMM). On a DIMM, the connections on each side of the module connects to different chips. This allows for a wider data path, as more modules can be accessed at once.

**DIN:** Deutsch Industrie Norm. A round multi-pin connector, generally used to connect the keyboard and mouse to the system.

**Disk:** Storage medium. See "Compact Disc," "Floppy Disk," "Hard Disk," and "Removable Storage".

**Disk-Imaging:** The creation of a template copy of a system software configuration for later transfer to selected workstations. The disk image is created to include the OS, hard drive partitions, FAT structure, and selected software; usually without the drivers for particular components, which must be added later. Once the image is created it can be transferred over a network for automatic installation to client workstations. Also called "ghosting."

**Disk Mirroring:** The recording of redundant data for fault tolerant operation. Data is written on two partitions of the same disk, on two separate disks within the same system or on two separate computer systems.

**DMA:** Direct Memory Access. A method for transferring data directly to and from system memory, bypassing the microprocessor.

**DMI:** Desktop Management Interface. An interface for managing computers by providing information about the system and its components to DMI-compliant viewers.

**DRAM:** Dynamic Random Access Memory. Memory that requires a periodic refresh cycle to keep the stored information from being lost. Loss of power causes loss of data in this memory.

**DSTN:** Double Super-Twisted Nematic or Dual-Scan Twisted Nematic. DSTN displays utilize dual-scan, passive matrix screen technology. The contrast ratio that goes as high as 30-to-1, and glare resistance ("washing out") is improved over earlier DSTN screens. But refresh rate is slower than with active matrix, or Thin Film Transistor (TFT), technology displays, which means DSTN is less desirable for motion video or animation. Supertwist refers to a technique for improving LCD display screens by twisting light rays. In addition to normal supertwist displays, there also exist double supertwist and triple supertwist displays. In general, the more twists, the higher the contrast. Dual scan refers to the process of refreshing the screen twice as fast as conventional passive matrix displays. Dual-scan displays are not as sharp or bright as active-matrix displays, but they consume less power.

**Duplexing:** Duplexing has all the benefits of mirroring but adds further protection utilizing different disk channels to connect two drives in a mirrored set. Often this is done using two SCSI controllers, one to each SCSI drive.

**DVD:** Digital Versatile Disc. A DVD disc is a high-density disc that holds large amounts of digital data for playback on a variety of electronic mediums; including DVD players, computers, audio CD players, etc. The DVD format presents cinema quality picture and sound via interactive menus. There are several existing DVD format standards: DVD-One layer, one side-4.5 GB; DVD-9 -One layer, dual sided-9 GB; DVD-10 -Two layers, each dual sided-17 GB; DVD-ROM -Designed for use in a computer and encompasses all formats.

**ECC:** Error Checking and Correction. Detects errors in transmitted data and attempts to correct them on the fly. The simplest form of error detection is a single added parity bit or a cyclic redundancy check. Multiple parity bits not only detect that an error has occurred, but also which bits have been inverted and should therefore be re-inverted or fixed to restore the original data.

**ECC RAM:** Error Checking and Correcting Memory. Advanced type of memory that can find and correct certain types of single-bit memory errors, providing greater data integrity. Advanced ECC can correct some double-bit errors.

**EDRAM:** Enhanced Dynamic Random Access Memory. Like cached DRAM, enhanced DRAM also incorporates an on-chip SRAM cache in an attempt to improve on the average access time. By improving the DRAM's performance (with the reduction of parasitic capacitance and an increase in transistor gain) to 35ns, and combining it with a 2Kb, 15ns SRAM cache, a DRAM chip with a 15ns access time is created. In contrast, cached DRAM uses a much larger 15Kb, 15ns cache and DRAM with a much slower 70ns access time.

**EDO RAM:** Extended Data Out Random Access Memory. A newer, faster type of computer memory that holds its last-requested data in a cache after releasing it. Now becoming standard on personal computers. EDO DRAM is almost the same as FPM, with a slight modification that allows back-to-back memory accesses to occur much faster.

**EEPROM:** Electrically Erasable Programmable Read Only Memory. Used to store modifiable BIOS code. It retains its contents for 10 years even with no power at all. For PCI bus machines, EEPROM will allow you to easily upgrade as the plug and play features are standardized.

**EIDE:** Extended Integrated Drive Electronics. The EIDE specification is an enhanced version of the IDE mass storage device interface that allows for faster transfer rates and supports larger hard drive sizes. It supports data rates of between 4 and 16.6 MB (megabytes) per second, and supports mass storage devices of up to 8.4 GB, using the logical block addressing feature to access data faster. EIDE is sometimes referred to as Fast ATA, or Fast IDE, which is essentially the same standard. There are four EIDE modes defined. The most

common is Mode 3, which transfer data at a rate of 11.1 MBps (megabytes per second). Mode 4 supports transfer rates of 16.6 MBps.

**EMI:** Electro-Magnetic Interference. Interference in the integrity of a signal caused by radiation. An example is the radiation from a fluorescent lamp, which emits a broad spectrum of electromagnetic radiation, including radiation that may be harmful to a signal not protected by either shielding or adequate twisting.

**ESCD:** Extended System Configuration Data. An area of BIOS memory that stores configuration data on all onboard and add-in cards.

**Ethernet:** IEEE-standard data link protocol that specifies how data is placed on and retrieved from a common transmission medium. Data is broken into packets, which are then transmitted using the Carrier Sense Multiple Access / Collision Detect (CSMA/CD) algorithm until they arrive at the destination without colliding with any other. A node is either transmitting or receiving at any instant. Bandwidth ~10 Mbps. Disk-Ethernet-Disk transfer rate with TCP / IP is typically 30 KBps. The cable is a 50 ohm coaxial cable with multiple shielding. Forms the underlying transport vehicle used by several upper-level protocols, including TCP/IP and XNS.

**Expansion Slot:** An integrated socket on the computer's main system circuit board allowing new capabilities to be added the computer. The boards inserted into the expansion slots are called expansion boards, expansion cards, add-ins, and add-ons. Expansion slots for PCs come in two basic sizes: half-and full-size. Half-size slots are also called 8-bit slots because they can transfer 8 bits at a time. Full-size slots are sometimes called 16-bit or 32-bit slots.

**Failback:** The process of returning control of some or all of the same (failover) customer resources to the original server after it has been returned to a working condition.

**Failover:** The process of transferring control of all customer resources, software applications, disk data, print spooler, etc., from the primary server to a surviving server because of a hardware or software system crash.

**Fault Tolerance:** Designed into disk array subsystems to maintain data integrity and data availability before, during and after a failure. Fault tolerance implies that any component in a subsystem can fail and the subsystem will remain operational. In addition to the disks in any array subsystem, the cabling, controllers, adapters and power supplies can have redundant capabilities.

**FDDI:** Fiber Distributed Data Interface. A 100 Mbps, Megabits per second, standard LAN architecture. The underlying medium is fiber-optic cable (though it can be copper cable, in which case it may be called CDDI) and the topology is a dual-attached, counter-rotating token ring.

**Fiber Optic Cable:** A transmission medium that uses glass or plastic fibers, rather than copper wire, to transport data or voice signals. The signal is imposed on the fibers via pulses (modulation) of light from a laser or a light-emitting diode (LED). Because of its high bandwidth and lack of susceptibility to interference, fiber-optic cable is used in long-haul or noisy applications. FDDI rings are normally constructed in the form of a "dual ring of trees". A small number of devices, typically infrastructure devices such as routers and concentrators rather than host computers, are connected to both rings. Host computers are then connected as single-attached devices to the routers or concentrators. The whole dual ring is typically contained within a computer room.

**Firewire:** Officially called IEEE 1394, firewire is a new, very fast external bus standard that supports data transfer rates of up to 400Mbps (400 million bits per second). A single firewire port can be used to connect up to 63 external devices. In addition to its high speed, firewire also supports isochronous data-delivering

data at a guaranteed rate. This makes it ideal for devices that need to transfer high levels of data in real-time, such as video devices. Although extremely fast and flexible, firewire is also much more expensive than a competing external bus standard called Universal Serial Bus (USB). Like USB, firewire supports both Plug-and-Play and hot plugging.

**Floppy Disk:** A 3.5 inch removable storage medium used for storing programs and files externally from the computer system.

**Format:** A process that prepares a disk to hold data. For hard disks, there are two formatting processes: low-level and high-level.

**FPM DRAM:** Fast Page Mode Dynamic Random Access Memory. Most computers in use today use FPM DRAM. If the data needed is in the same row as the previous data, the memory controller does not have to repeat the row location; it only needs to indicate the next column location. Using FPM memory is like reading a dictionary. As long as the word you want is on the same "page," it will be easy to scroll down the list and find the definition; but when you have to flip pages, it takes a little longer to find what you want.

**FULL SCSI:** A SCSI solution that includes BIOS and support software to provide boot capability for hard disk drives, support for drives larger than 1 B, and full compatibility with removable media products (hard drives, optical drives, tape drives, and Floptical drives).

**FRU:** Field Replacement Unit.

**Gateway:** A device that can interconnect networks with different, incompatible communications protocols. The gateway performs a layer-7 protocol-conversion to translate one set of protocols to another. A gateway operates at Open Systems Interconnection (OSI) layers up through the Session Layer.

**Hard Disk:** An internal or external, high-capacity, high-storage medium. Most hard disks are permanently connected to the drive (fixed disks).

**Hertz (Hz):** A unit of frequency equal to one cycle per second.

**Hot Plugging:** The ability to add and remove devices to a computer while the computer is running and have the operating system automatically recognize the change. Two new external bus standards—Universal Serial Bus (USB) and firewire—support hot plugging.

**I/O Port:** A connector that allows external and some internal peripherals to communicate with the computer system (i.e., serial ports and parallel ports).

**I/O:** Input / Output. A generic term that refers to the devices and processes involved in the computer's reading and writing data.

**IDE:** Integrated Drive Electronics. A protocol and circuitry for communication between a computer and a Hard Drive. Currently the most popular type of hard drive used in PCs. A standard IDE adapter can handle a maximum of two hard drives total.

**Integrated Circuit:** An electronic device that combines thousands of transistors on a small chip of silicon or other semiconductor. Such devices are the building blocks of computers.

**Interface:** The connection between you and the computer, or between the computer and peripheral devices.

**ISA:** Industry Standard Architecture. The standard bus interface that was implemented in the IBM AT.

**Isochronous:** Equal in duration; Characterized by or occurring at equal intervals of time.

**Joystick:** This input device plugs into the game/midi port and allows you to control elements of some computer games. Especially beneficial with flight simulators and some action/adventure games.

**Jumper:** On a printed circuit board, a patch cable or wire used to establish a circuit.

**LAN:** Local Area Network. LANs are data communications networks which are geographically limited, allowing easy interconnection of terminals, microprocessors and computers within adjacent buildings.

**LBA:** Logical Block Addressing. Allows the system to address from 504 MB to 8.4 Gigabytes on the IDE hard drive.

**LVDS:** Low-Voltage Differential Signal.

**MAU:** In a Token Ring network, a device to attach multiple network stations in a star topology, internally wired to connect the stations into a logical ring. The MAU contains relays to short out nonoperating stations. Multiple MAUs can be connected into a larger ring through their Ring In / Ring Out connectors.

**MBps:** Megabytes per second.

**Megahertz (MHz):** A frequency of 1 million cycles per second.

**Memory:** Devices used to hold information and programs while they are being accessed by the microprocessor. Also see, RAM, ROM, Hard Disk, Floppy Disc, and Removable Storage.

**Microprocessor:** An integrated circuit that contains the circuits the computer needs to calculate and to communicate with the other parts of the system. Also see, CPU.

**MIDI:** Musical Instrument Digital Interface. A hardware specification and protocol used to communicate note and effect information between synthesizers, computers, keyboards, controllers and other electronic music devices.

**MIRRORING:** Also, known as RAID 1 or duplexing (when using duplicating all data from a primary disk on a secondary disk. The overhead of requiring 100 percent data duplication can be costly when using more than two drives. Also see, "Disk Mirroring."

**MMX:** Multimedia Extensions. A Pentium processor with 57 new instructions onboard to accelerate multimedia and communications applications. Running MMX technology encoded software on a Pentium processor with MMX technology improves the speed and smoothness of audio and video playback, image processing and 3D rendering by more than 60 percent. Current software (not enhanced with MMX technology) runs 10-20 percent faster on a Pentium processor with MMX technology.

**Modem:** Modulator/Demodulator. A device designed to allow computers to communicate over standard phone lines.

**MPEG:** Moving Pictures Expert Group. Audio/Video technology that allows for better than VHS quality video and almost CD quality audio by utilizing advanced compression techniques.

**Non-Volatile Memory:** Memory that is maintained even when power is not on.

**On-Board Floppy:** A floppy disk drive controller that is incorporated into the system board.

**Open:** A circuit that is not complete. Usually accomplished by removing a jumper from two pins on the system board or a peripheral card. Also see "Closed" and "Jumper."

**Operating System:** The software that provides a link between application programs and the computer hardware (i.e., disks, memory).

**OSI:** Open Systems Interconnection, OSI is the umbrella name for a series of non-proprietary protocols and specifications, used with a system of networked computers. The OSI architecture is split between seven layers, from lowest to highest:

1. Physical layer: this layer determines how signals are transmitted on the network cabling.
2. Data Link: incorporates the logical link (LLC) and media access control (MAC) sub layers. The data link layer transmits data grouped into frames using the Ethernet or Token ring access methods.
3. Network layer: handles the routing of data in packets using the networking protocols.
4. Transport layer: ensures error free data transmissions.
5. Session layer: establishes and maintains connections between nodes according to the appropriate protocol.
6. Presentation layer: handles data encoding and formatting; provides data compression.
7. Application layer: provides the means for application processes to use the network services; the interface to user database, file and E-Mail software often implemented with API's (application programming interfaces).

Each OSI layer uses the layer immediately below it and provides a service to the layer above.

**PCI:** Peripheral Component Interface. A form of local bus architecture that provides high-speed interconnection without directly interfacing with the processor.

**Page:** Sections of memory consisting of sets of consecutive bytes. Pages begin on 4-Kb boundaries.

**Peripheral:** Any device that is connected to the computer system (i.e., printers, keyboard, plotters, etc.).

**Peripheral Card:** A printed circuit board that gives the computer added capability, such as more memory or control of a new device. A card plugs into one of the expansion slots located on the system board.

**Pin:** Any of the leads on a device, such as an integrated circuit, that plug into a socket and connect to a system.

**PnP:** Plug-and-Play. Refers to the ability of a computer system to automatically configure expansion boards and other devices. The technology developed by Microsoft and Intel that supports plug-and-play installation. PnP is built into the Windows 95 operating system, but to use it, the computer's BIOS and expansion boards must also support PnP. This is changing, as IBM PC manufacturers adopt the new PnP specifications.

**POST:** Post On Self Test. Check-out procedures that the BIOS runs automatically when the system is turned on. These procedures verify that all computer hardware is functioning properly. If the test detects problems, the computer displays error codes before (or instead of) starting the operating system. The error codes can help a service person determine what is wrong with the computer.

**Protocol:** A set of formal rules describing how to transmit data, especially across a network. Low level protocols define the electrical and physical standards to be observed, bit- and byte-ordering and the transmission and error detection and correction of the bit stream. High level protocols deal with the data formatting, including the syntax of messages, the terminal to computer dialogue, character sets, sequencing of messages, etc.

**RAID:** Redundant Array of Independent Drives. A technology

using a software or hardware controller with several disk drives to allow varying degrees of either increased performance and/or data integrity by combining several hard disk drives. RAID configuration is typically used on a network file server. Levels of redundancy or data security are dependent on the number of drives in the array, as well as the way the data is stored across the drives.

**RAM:** Random-Access Memory. The type of computer memory that can be used to store information while a program is running. RAM consists of a number of small integrated circuits that are plugged into the system board or an external memory card.

**Removable Storage:** These devices allow you to store large quantities of data. These devices far exceed the storage capabilities of floppy disks. Read-Only Memory. The type of computer memory that is used to permanently store the information vital to computer operation, including some parts of the operating system. ROM is permanent and the contents will not be lost when power to the computer is turned off.

**RISC:** Reduced Instruction Set Chip. A processor whose design is based on the rapid execution of a sequence of simple instructions rather than on the provision of a large variety of complex instructions. Also see, CISC.

**ROM:** Read Only Memory. The type of computer memory that is used to permanently store the information vital to computer operation, including some parts of the operating system. ROM is permanent and the contents will not be lost when power to the computer is turned off.

**SCA:** Single Connector Attachment. A non-standard type of SCSI connector, used mostly by OEMs, which carries both power and data on one 80-pin connector. SCA SCSI drives tend to be cheaper but use with standard SCSI cables requires an adapter and external termination.

**Scalability:** The ability to expand. Implies minimal change in current procedures in order to accommodate growth. When using “Cluster-aware” application software allows any Application Programming Interface to do dynamic load balancing and scale across multiple servers within a cluster.

**SCSI:** Small Computer System Interface. A processor-independent standard for system-level interfacing between a computer and intelligent devices, such as hard disks, floppy disks, CD-ROM, printers, scanners, and others. SCSI can connect up to seven devices to a single controller (or “host adapter”) on the computer’s bus.

**SDRAM:** Synchronous Dynamic Random Access Memory. This is a form of DRAM which adds a separate clock signal to the control signals. These chips can contain more complex state machines, allowing them to support “burst” access modes that clock out a series of successive bits.

**Setup Program:** Used to inform the computer about installed peripheral, memory, configuration information, date and time, etc.

**Shadow RAM:** A method of copying BIOS routines from slower ROM chips to much faster RAM, increasing system performance.

**SPD:** Serial Presence Detect. A region of non-volatile memory on the memory module that holds configuration information about the module.

**SRAM:** Static Random Access Memory. Does not require periodic refreshing that dynamic memory requires.

**Striping:** A process that combines multiple areas of disk space into one large logical drive. Data is distributed evenly over drives in a stripe set. All drives in a stripe set work to perform the same functions done by a single drive in a normal configuration. Allows

concurrent I/O. Striping requires at least two drives. A process of spreading data evenly over multiple-disk drives to enhance performance. Data striping can be performed on a bit, byte or block basis for optimum application performance. Refer to RAID.

**SVGA:** Super Video Graphics Array. A set of graphic standards designed to offer greater resolution than VGA. There are several varieties of SVGA, each providing a different resolution: 800 x 600 pixels, 1024 x 768 pixels, 1280 x 1024 pixels, 1600 x 1200 pixels. SVGA standards can support up to a palette of 16 million colors, but the number of colors that can be displayed is limited by the amount of video memory installed in a system. The base resolution for this standard is 640x480 pixels, with a color pallet of 256 colors.

**System Board:** The large printed-circuit board in a computer on which most electronic devices are mounted; the primary board in a computer. All other interfaces receive control signals or information from the system board. Also commonly referred to as the “mainboard” or “motherboard.”

**System:** The assembly of basic components (i.e., power supply, motherboard, memory, video monitor, etc.) united by some form of communication to form an organized whole.

**System Unit:** The description for the computer case and all internal components (i.e., the system board, expansion cards, disk drives, power supply, etc.).

**Tera:** Trillion. Abbreviated “T.” Computer specifications refer to the precise value 1,099,511,627,776.

**Terabyte:** One trillion bytes. Also, TB, Tbyte and T-byte.

**UPS:** Uninterruptable Power Supply. A device that supplies temporary power to the computer when the Local Commercial power is interrupted, allows time to save the data files, close applications that are open, and turn AC power OFF normally, without losing data.

**USB:** Universal Serial Bus. A new external bus standard that supports data transfer rates of 12Mbps (12 million bits per second). A single USB port can be used to connect up to 127 peripheral devices, such as mice, modems and keyboards. USB also supports Plug-and-Play installation and hot plugging.

**VGA:** Video Graphics Array. The most widely accepted graphics hardware standard and the lowest common denominator for all graphics cards and monitors manufactured to date.

**Wait State:** A delay in the computer's information processing cycle caused by a difference in speed between a faster processor and slower memory. A 0-wait state means the processor does not have to "wait" for memory, and can access data as fast as needed.

# Appendix D Abbreviations

**ACPI**

Advanced Configuration and Power Interface

**AMD**

Advanced Micro Devices

**APM**

Advanced Power Management

**ASKIR**

Amplitude shift keyed infrared port

**ATA**

AT Attachment (Advanced Technology Attachment)

**ATAPI**

AT Attachment Packet Interface

**BIOS**

Basic Input/Output System

**CMOS**

Complementary Metal Oxide Semiconductor

**CPU**

Central Processing Unit

**DIMM**

Dual In-line Memory Module

**DMA**

Direct Memory Access

**DRAM**

Dynamic Random Access Memory

**D-STN**

Dual Scan STN (Super Twisted Nematic)

**D-STN XGA**

Dual Scan STN (Super Twisted Nematic) Extended Graphics Array

**ECP**

Enhanced Capabilities Port

**EDO DRAM**

Extended Data Output DRAM

**EIDE**

Enhanced IDE (Integrated Drive Electronics)

**EPP**

Enhanced Parallel Port

**FDC**

Floppy disk controller

**FIR**

Fast Infrared

**GB**

Gigabyte (1GB = 1,073,741,824 bytes or 1,024MB)

**HP SIR**

Hewlett-Packard Serial InfraRed

**I/O**

Input/Output

**IDE**

Integrated Drive Electronics (internal hard disk drive interface)

**IEEE**

Institute of Electrical and Electronics Engineers

**IrDA**

Infrared Data Association

**LAN**

Local Area Network

**LCD**

Liquid Crystal Display

**LCM**

Liquid Crystal Module

**LED**

Light Emitting Diode

**Li-Ion**

Lithium Ion (battery)

**MB**

Megabyte (1MB = 1,048,576 bytes or 1,024KB)

**MESI**

Modified Exclusive Shared and Invalid (protocol)

**MHz**

MegaHertz

**MIDI**

Musical Instrument Digital Interface

**MMU**

Memory Management Unit

**MMX**

MultiMedia EXtensions

**MPEG**

Motion Picture Experts Group

**MS-DOS**

Microsoft Disk Operating System

**Ni-MH**

Nickel Metal Hydride

**NTSC**

(National TV Standards Committee) The US color TV standard administered by the FCC. It currently broadcasts at 525 lines of resolution that are transmitted as 30 interlaced frames per second (60 half frames per second, or 60 “fields” per second in TV jargon).

**PAL**

(Phase Alternating Line) A European color TV standard that broadcasts an analog signal at 625 lines of resolution 25 interlaced frames per second (50 half frames per second).

**PCI**

Peripheral Component Interconnect

**PCMCIA**

Personal Computer Memory Card International Association

**PGA**

Pin Grid Array

**PIO**

Programmed Input/Output

**POST**

Power On Self-Test

**RAM**

Random Access Memory

**ROM**

Read Only Memory

**RTC**

Real Time Clock

**SIR**

Serial Infrared

**SMI**

System Management Interrupt

**SPP**

Standard Parallel Port

**SRAM**

Static Random Access Memory

**SVGA**

Super Video Graphics Array

**S-Video**

S-video hookups use a special 5-pin connector rather than the common RCA phono plug.

**TFT**

Thin Film Transistor

**TFT XGA**

Thin Film Transistor Extended Graphics Array

**USB**

Universal Serial Bus

**VGA**

Video Graphics Array

**XGA**

Extended Graphics Array

**ZV Port**

Zoomed Video Port

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